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**PART 8: RESOURCES AND
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ALTERNATIVES
(THE AFFECTED ENVIRONMENT)**

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INTRODUCTION

2

3 This part of the document describes the existing environment of Golden Gate National
4 Recreation Area and Muir Woods National Monument. This discussion serves to identify
5 the current conditions in the park that could be affected by the implementation of any of
6 the alternatives in this plan. The information is organized around six general topics:
7 natural resources, cultural resources, visitor use and experience, social and economic
8 environment, transportation, and park operations, although there is some overlap between
9 social and economic environment and transportation.

10 Regarding the discussion of the first three topics —natural resources, cultural resources,
11 and visitor use and experience—differences between the two parks are distinct enough to
12 warrant separate discussions for Golden Gate National Recreation area and Muir Woods
13 National Monument. However, because of the proximity of the two parks, and their
14 similar relationships to the urban centers within the planning area, combine discussions
15 that incorporate information about both parks are presented for the last three topics.

16 Table 1, beginning on the next page, presents more detailed information on specific
17 impact topics that were retained or dismissed from further evaluation and why.

SUMMARY TABLE OF IMPACT TOPICS

Table 1: Impact Topics Retained For or Dismissed From Detailed Analysis

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
<p>Carbon Footprint and Air Quality <i>Retained</i></p>	<p>Retained as an impact topic for further detailed analysis because of the interest in minimizing greenhouse gas emissions and reducing the carbon footprint of the park and monument, the Bay Area, and the state of California. The focus of the analysis is on greenhouse gas emissions related to NPS operational activities and how that would vary among the alternatives included in the plan.</p> <p>The park and monument within the class II air quality areas under the Clean Air Act, as amended. A class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in Section 163 of the Clean Air Act.</p> <p>The California Clean Air Act of 1988, as amended, sets ambient air quality standards that are stricter than the federal standards and requires local air districts to promulgate and implement rules and regulations to attain those standards. Under the act, California Ambient Air Quality Standards (CAAQS) are set for all pollutants covered under national standards, as well as vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet the California standards, it is designated as a state nonattainment area.</p> <p>Golden Gate National Recreation Area and Muir Woods National Monument are in the San Francisco Bay Area Air Basin, which consists of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and Marin counties, as well as portions of Sonoma and Solano counties. The Bay Area Air Quality</p>	<p>Clean Air Act; Executive Order 13423;</p> <p>DOI Secretarial Order 3226, Amendment No.1;</p> <p>California Global Warming Solutions Act of 2006 (AB32);</p> <p>NPS <i>Management Policies 2006</i>;</p> <p>NPS <i>Pacific West Region Directive PW-047</i></p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p>Management District is the air quality agency responsible for the entire basin. The San Francisco Bay Area is designated a federal nonattainment area for ozone and a state nonattainment area for ozone and inhalable particulate matter.</p> <p>Dust and exhaust emissions would be produced by development activities and the potential for increased vehicular traffic to the two parks; however, these activities would not be expected to cause national ambient air quality standards to be exceeded because visitation increases would be relatively small and the level of new development proposed is minimal. Air quality impacts from the use of prescribed fire were analyzed in the park's <i>Fire Management Plan/ Environmental Impact Statement</i>. Any amount of pollutants added because of the actions proposed in this general management plan would be negligible compared to existing levels. None of the actions described in this plan would violate any air quality standard or result in a cumulatively considerable net increase of any criteria pollutant for which the Bay Area is in nonattainment under federal or state ambient air quality standards. Implementation of any of the alternatives described in the plan would have negligible effects on air quality and the class II air quality status of the two parks would be unaffected.</p>	
<p>Soils and Geologic Resources and Processes (including natural shoreline and coastal processes) <i>Retained</i></p>	<p>Soils and geologic resources and processes are an important component of maintaining the ecological integrity of the park and monument. Actions included in the plan, such as recreational facility development, changes in visitor use, and restoration, could affect soils and natural coastal processes. Any impacts that would adversely affect soils or geologic processes would be of concern to NPS managers and the public. Therefore, this topic was retained for detailed analysis.</p>	<p>NPS <i>Management Policies 2006</i></p>

Impact Topic <i>(Retained or Dismissed from further analysis)</i>	Rationale	Relevant Law, Regulation, or Policy
<p>Water Resources and Hydrologic Processes</p> <p>(including stream character, water quantity and quality, watershed processes, wetlands, floodplains, and marine/estuarine resources)</p> <p><i>Retained</i></p>	<p>Water resources and hydrologic processes are an important component of the ecological communities of the park and monument. Development can alter, and has altered in the past, natural surface flows and watershed processes, with subsequent effects on the natural environment. Actions included in the plan, such as recreational facility development and stream/habitat restoration could affect water quality, wetlands, floodplains, and watershed processes. Therefore, water resources and hydrologic processes were retained for detailed analysis.</p>	<p>Clean Water Act; Executive Order 12088;</p> <p>Executive Order 11990;</p> <p>Executive Order 11988;</p> <p><i>NPS Management Policies 2006</i>;</p> <p>Director's Order 771;</p> <p>Director's Order 77-2</p>
<p>Habitat (Vegetation and Wildlife)</p> <p><i>Retained</i></p>	<p>Terrestrial and aquatic habitat is an important resource that defines the natural environment. The park and monument contain a diversity of plant and animal habitats. Actions included in the plan, such as recreational facility development, changes in visitor use, and restoration, could affect natural habitat values. Proposed actions could beneficially or adversely affect these resources, which would be of concern to NPS managers and the public. Therefore, this topic was retained for detailed analysis.</p>	<p>NPS Organic Act;</p> <p><i>NPS Management Policies 2006</i></p>
<p>Special Status Species: Federal Threatened and Endangered</p> <p><i>Retained</i></p>	<p>The park and monument host a variety of federal-listed species. Actions included in the plan, such as recreational facility development, changes in visitor use, and habitat restoration, could affect the quality of habitat preferred by these species, as well as the behavior of certain species. Therefore, federal-listed species were retained for detailed analysis and include: Northern spotted owl, Coho salmon, Steelhead, California red-legged frog, Mission blue butterfly, Tidewater goby, California brown pelican, Western snowy plover, San Francisco lesingia, San Francisco garter snake, San Bruno elfin butterfly.</p>	<p>Endangered Species Act;</p> <p>Migratory Bird Treaty Act;</p> <p><i>NPS Management Policies 2006</i></p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
<p>Special Status Species: State Threatened and Endangered <i>Retained</i></p>	<p>The park and monument host a few of state-listed species. Actions included in the plan, such as recreational facility development, changes in visitor use, and habitat restoration, could affect the quality of habitat preferred by these species, as well as the behavior of certain species. Therefore, state-listed species were retained for detailed analysis and include: Bank swallow, and Montara Manzanita.</p>	<p>Endangered Species Act; California Endangered Species Act; NPS <i>Management Policies 2006</i></p>
<p>Special Status Species: Other Federal and State-Listed Species <i>Dismissed</i></p>	<p>Other federal and state-listed species known to occur in the area (see appendix D for a listing of all special status species) were dismissed because 1) these species are typically not found in the park or monument, or 2) their preferred habitat would not be physically disturbed by any of the GMP alternatives, or 3) the effects of actions included in the alternatives on these species would be negligible.</p>	<p>Endangered Species Act; Bald and Golden Eagle Protection Act; Migratory Bird Treaty Act; Marine Mammal Protection Act; National Environmental Policy Act; California Endangered Species Act; NPS <i>Management Policies 2006</i></p>
<p>Essential Fish Habitat <i>Dismissed</i></p>	<p>In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, federal agencies that fund, permit, or carry out activities that may adversely impact essential fish habitat are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential adverse effects of their actions on essential fish habitat; such agencies must also respond in writing to NMFS recommendations.</p> <p>Essential fish habitat is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Waters include aquatic areas and their associated physical, chemical, and</p>	<p>Magnuson-Stevens Fishery Conservation and Management Act</p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p>biological properties. Substrate includes sediment underlying the waters. “Necessary” means the habitat required to support a sustainable fishery and the species’ contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types used by a species throughout its life cycle. The conservation of essential fish habitat is an important component of building and maintaining sustainable fisheries. Loss or degradation of essential fish habitat is primarily the result of activities such as point and nonpoint water pollution, livestock grazing, mining, road construction, estuarine or marine habitat alteration, creation of migration barriers or hazards, increases or decreases in sediment delivery, and alteration of stream banks, shorelines, wetlands, and floodplains.</p> <p>The San Francisco Bay, a migratory corridor between riverine habitat and the Pacific Ocean, is designated critical habitat for several listed fish species. Habitat loss and degradation is primarily the result of overfishing, timber harvest, point and nonpoint water pollution, livestock grazing, mining, road construction, diking and stream bank stabilization, and dredge and fill activities.</p> <p>None of the actions proposed in the GMP alternatives would contribute to essential fish habitat loss or degradation. Some of the actions described in this plan would contribute to improvements in the quality or quantity of essential fish habitat; however, additional environmental compliance and consultation with NMFS would take place prior to implementation of these specific projects. Therefore, the topic of essential fish habitat was dismissed from further analysis.</p>	
<p>Marine Protected Areas <i>Retained</i></p>	<p>Executive Order 13158, “Marine Protected Areas,” defines marine protected areas as any area of the marine environment that has been reserved by federal, state, territorial, tribal, or</p>	<p>Executive Order 13158</p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p>local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. The executive order requires every federal agency to identify its actions that affect the natural or cultural resources that are protected by a marine protected area and, to the extent permitted by law and the maximum extent practicable, to avoid harming these resources. There are several federal and state-designated marine protected areas in the vicinity of the park. Impacts to the natural and cultural resources protected by these marine protected areas are analyzed under their respective topics and marine protected areas are not included as a separate impact topic.</p>	
<p>Prime and Unique Farmlands <i>Dismissed</i></p>	<p>In August, 1980, the Council on Environmental Quality (CEQ) directed that federal agencies assess the effects of their actions on farmland soils classified as prime or unique by the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olives, cranberries, fruit, and vegetables). The Farmland Protection Policy Act (7 USC 4201 <i>et seq.</i>) and the U.S. Department of the Interior (Environmental Statement Memorandum No. ESM94-7 – Prime and Unique Agricultural Lands) require an evaluation of impacts on prime or unique agricultural lands.</p> <p>According to NRCS soils data, prime and unique farmlands do exist within the jurisdictional boundaries of Golden Gate National Recreation Area in San Mateo County at and adjacent to the Rancho Corral de Tierra property. All of these farmlands (with one small exception) are in private ownership and will not</p>	<p>Farmland Protection Policy Act; Council on Environmental Quality 1980 memorandum</p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p>be acquired or managed by the NPS as part of the future land transfer with the Peninsula Open Space Trust (POST). The one exception is an approximately 2-acre piece of farmland (adjacent to the privately-owned Aenlle property) that contains prime soils and is scheduled to be acquired by the NPS as part of the land transfer. These two acres are currently leased by POST to a private tenant for agricultural use. Once acquired by the NPS, the NPS intends to continue to lease it for agricultural production. IS THIS FACTUAL? The management zone applied to this acreage by the NPS' preferred alternative is compatible with its historic land use and its proposed short-term use as an active agricultural property. Consequently, no loss of prime soils or their potential for agricultural production would occur. However, the management zone used under the preferred alternative and one or more of the other GMP alternatives does allow either broader visitor uses and facility development or ecosystem restoration. Should the NPS decide to discontinue the agricultural use of the prime farmland and convert it to a non-agricultural use that could adversely impact its soil resources and its use and potential for agricultural production, then the NPS would be required to evaluate the impacts on prime farmland and consult with the NRCS.</p> <p>Within Golden Gate National Recreation Area in Marin County, only Farmland of Statewide Importance exists – there are no prime and unique farmlands. Based on a determination by NRCS in 2007, soils and farmland in the vicinity of the Lower Redwood Creek property are not classified as prime or unique farmland (Parson 2007).</p> <p>In addition, there are no prime and unique farmlands within the boundaries of Muir Woods National Monument. Therefore, this topic was dismissed from further analysis.</p>	

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
<p>Natural or Depletable Resource Requirements and Conservation Potential <i>Dismissed</i></p>	<p>None of the alternatives being considered would result in the extraction of new resources from Golden Gate National Recreation Area or Muir Woods National Monument. In all of the alternatives, ecological principles would be applied to ensure that the park and monuments' natural resources were maintained and protected. Certain resources could continue to be collected for scientific and educational purposes, and the specimens would be stored in the NPS collection. Agricultural operations on NPS lands would continue to result in the harvesting of crops, which assist in meeting cultural landscape objectives. The fields would be managed to sustain this harvest. Implementation of the alternatives would result in the use of limited natural resources and energy for construction and operation of new recreational facilities and for restoration activities. New development would be designed to be sustainable to the maximum extent practicable. The use and consumption of fuel and other nonrenewable resources for NPS operations, activities, and development associated with the alternatives would be very small in comparison to that of the region. Overall, the impact on this topic would likely be negligible and thus it was dismissed from detailed analysis.</p>	<p>National Environmental Policy Act; Council on Environmental Quality</p>
<p>Energy Requirements and Conservation Potential <i>Dismissed</i></p>	<p>Council on Environmental Quality guidelines for implementing NEPA require examination of energy requirements and conservation potential in environmental impact statements. NPS staff strive to incorporate the principles of sustainable design and development into all facilities and park operations. Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short-term and long-term environmental impacts of developments and other activities through resource conservation, recycling, waste minimization,</p>	<p>National Environmental Policy Act; Council on Environmental Quality</p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p>and the use of energy efficient and ecologically responsible materials and techniques.</p> <p>The NPS <i>Guiding Principles of Sustainable Design</i> (1993) provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of bio-diversity, and encourages responsible decisions. The guidebook describes principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors within natural and cultural settings. The NPS would minimize energy costs, eliminate waste, and conserve energy resources by using energy efficient and cost effective technology wherever possible. Recent examples include projects to install photovoltaic panels on the NPS Headquarters building at Upper Fort Mason and projects to pursue alternative energy options at Alcatraz Island. Energy efficiency would also be incorporated into any decision-making process during the design or acquisition of facilities, as well as all decisions affecting park operations.</p> <p>The use of value analysis and value engineering, including life cycle cost analysis, would be performed to examine energy, environmental, and economic implications of proposed NPS development. NPS staff would encourage suppliers, permittees, and contractors to follow sustainable practices and would address sustainable park and park partner practices in interpretive programs. Consequently, any adverse impacts relating to energy use, availability, or conservation would be negligible. Therefore, energy requirements and conservation potential was dismissed from further analysis.</p>	
<p>Archeological Resources <i>Retained</i></p>	<p>Actions included in the plan, such as recreational facility development, changes in visitor use, and ecosystem restoration, could result in impacts to archeological resources.</p>	<p>National Historic Preservation Act; National Environmental Policy</p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	Therefore, this topic has been retained for detailed analysis.	Act; Secretarial Order 13007; Director's Order 28; NPS <i>Management Policies 2006</i> ; NPS-28A, "Archeological Resources Management"
Cultural Landscapes <i>Retained</i>	Actions included in the plan, such as recreational facility development, changes in visitor use, and ecosystem restoration, could result in impacts to the integrity and function of identified or potential cultural landscapes. Therefore, this topic has been retained for detailed analysis.	NPS <i>Management Policies 2006</i> ; NPS-28, "Cultural Resources Management"
Ethnographic Resources <i>Retained (for Alcatraz Island only)</i>	No identified ethnographic resources exist in the park and monument, except for resources at Alcatraz Island that may have ethnographic significance to certain American Indians. Actions included in the plan, such as recreational facility development, changes in visitor use, and restoration, could result in impacts to potential ethnographic resources at Alcatraz Island. Therefore, this topic has been retained for detailed analysis.	National Environmental Policy Act; Secretarial Order 13007; Director's Order 28; NPS <i>Management Policies 2006</i> ; NPS-28, "Cultural Resources Management"
Historic Structures <i>Retained</i>	Many of the structures in the park and monument are listed or have been determined eligible for listing in the National Register of Historic Places. Actions included in the plan, such as adaptive reuse of structures and buildings and changes in visitor use, could result in impacts to historic structures. Therefore, this topic has been retained for detailed analysis.	National Historic Preservation Act; NPS <i>Management Policies 2006</i> ; NPS-28, "Cultural Resources Management"

Impact Topic <i>(Retained or Dismissed from further analysis)</i>	Rationale	Relevant Law, Regulation, or Policy
Museum Collections <i>Retained</i>	Actions included in the plan, such as options for the use, curation, and storage of museum collections, could result in impacts to museum collections. Therefore, this topic has been retained for detailed analysis.	National Historic Preservation Act; <i>NPS Management Policies 2006</i> ; Director's Order 24, "Museum Collections Management"
Indian Trust Resources <i>Dismissed</i>	Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources or sacred sites in the park or monument; therefore, this topic was dismissed from further consideration.	Secretarial Order 3175
Visitor Use and Experience (including diversity of recreation opportunities; visitor access; experience of the park setting; visitor understanding, education, and interpretation; and visitor safety) <i>Retained</i>	Enjoyment of the park resources by visitors is part of the fundamental purpose of a national park unit. The visitor experience is an important issue that could be appreciably affected under the alternatives. The Organic Act and NPS <i>Management Policies 2006</i> direct the National Park Service to provide enjoyment opportunities that are uniquely suited and appropriate to the resources found in the park and monument. The types and levels of access are important components of visitor use and experience and are of concern to many people as well as NPS managers. Therefore, this topic was retained for detailed analysis.	Enabling legislation; <i>NPS Management Policies 2006</i>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
<p>Lightscape (Dark Night Sky Preservation) <i>Dismissed</i></p>	<p>Due to its urban setting, light pollution is present in many areas of Golden Gate National Recreation Area (GGNRA) and Muir Woods National Monument, although some areas retain a high degree of natural darkness. The NPS strives to minimize the intrusion of artificial light into the night scene by limiting the use of artificial outdoor lighting to basic safety requirements, shielding the lights when possible, and using minimal impact lighting techniques. Any new facilities proposed in the alternatives that would necessitate new night-time lighting would be constructed with down lighting that would minimize light pollution. Furthermore, the level and type of new development and lighting proposed in the plan is minimal and dispersed. The effects of actions contained in this plan on natural lightscapes would be negligible to minor. Therefore, lightscape was dismissed from further analysis.</p>	<p>NPS Organic Act; Enabling legislation; NPS <i>Management Policies 2006</i></p>
<p>Public Health and Safety <i>Dismissed</i></p>	<p>The proposed developments and actions included as part of the GMP alternatives would not result in any identifiable adverse impacts on human health or safety. Furthermore, visitor safety is addressed under the topic of visitor use and experience. Therefore, public health and safety was dismissed from further analysis.</p>	<p>CEQ regulations; <i>Director's Order 12 Handbook</i></p>
<p>Soundscape (Natural Sound Preservation) <i>Dismissed</i></p>	<p>An important part of the NPS mission is the preservation of natural soundscapes associated with national park system units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in a park unit, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among</p>	<p>NPS Organic Act; NPS <i>Management Policies 2006</i>; Director's Order 47</p>

Impact Topic <i>(Retained or Dismissed from further analysis)</i>	Rationale	Relevant Law, Regulation, or Policy
	<p>national park system units, as well as potentially throughout each park unit; generally acceptable levels are greater in developed areas and less in undeveloped areas.</p> <p>Unnatural sounds, often a byproduct of recreational activities, can be intrusive and can impact natural soundscape conditions that affect visitor experience and use and wildlife. The NPS has taken significant steps to preserve natural soundscapes and manage human-caused noise, especially at Muir Woods National Monument where data collection, research, and management actions have improved the natural soundscape and successfully led to improved visitor experiences. Actions included in the plan would not substantially change visitor use and the generation of human-caused noise compared to current conditions; consequently, sound conditions in the park and monument would not be expected to be substantially affected – the impact to the natural soundscape would be negligible to minor. Therefore, this topic was dismissed from further analysis.</p>	
<p>Social and Economic <i>Retained</i></p>	<p>The social and economic conditions of the Bay Area and the gateway counties of Marin, San Francisco, and San Mateo counties influence Golden Gate National Recreation Area and Muir Woods National Monument and how they are managed. Conversely, the park and monument directly contributes to the social and economic conditions of these three counties and the Bay Area as a whole. This section describes the potential beneficial and adverse impacts related to this relationship by highlighting the park’s quality of life benefits as well as the Bay Area’s demographic and economic trends.</p>	<p>National Environmental Policy Act</p>
<p>Conformity with Local Land Use Plans</p>	<p>The basic land use of the park and monument as a public recreation and resource management area is in conformance with local</p>	<p>CEQ regulations; <i>Director’s Order 12</i></p>

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
<i>Dismissed</i>	land use plans. The creation of additional recreation and visitor service opportunities in the parks as proposed in the alternatives would be consistent with existing park land uses or local (non-NPS) land use plans, policies, or controls for the area. Therefore, this topic was dismissed from detailed analysis.	<i>Handbook</i>
Urban Quality and Design of the Built Environment <i>Dismissed</i>	The quality of urban areas would be addressed by design guidelines used to guide new development and the rehabilitation of existing buildings and structures, as well as project review processes that the NPS has in place, all of which are part of standard operating procedures. Throughout the park and monument, vernacular architecture and compatible design would be considered for new structures built (or modifications to existing structures) under all of the alternatives. Emphasis would be placed on designs, materials, and colors that blend in and do not detract from the natural and built environment. Consequently, adverse impacts to the quality of urban areas are anticipated to be negligible. Therefore, this topic was dismissed from detailed analysis.	40 <i>Code of Federal Regulations</i> (CFR)1 502.16
Environmental Justice <i>Dismissed</i>	Executive Order 12898 requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the Environmental Protection Agency, environmental justice is the <i>fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including a racial,</i>	Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"

Impact Topic (Retained or Dismissed from further analysis)	Rationale	Relevant Law, Regulation, or Policy
	<p><i>ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.</i></p> <p>Marin, San Francisco, and San Mateo counties, where the park and monument are located, contain minority and low-income populations; however, environmental justice is dismissed as an impact topic for the following reasons:</p> <ul style="list-style-type: none"> • NPS staff and planning team actively solicited public participation as part of the planning process and gave equal consideration to input from all persons regardless of age, race, income status, or other socioeconomic or demographic factors. • Implementation of any of the alternatives would not result in any disproportionate human health or environmental effects on minorities or low-income populations and communities. • The impacts associated with implementation of the alternatives would not result in any effects that would be specific to any minority or low-income community. Any anticipated impacts, such as traffic, would not disproportionately affect minority or low-income populations. 	
<p>Visitor Connections to Park Sites and Communities <i>Retained</i></p>	<p>Actions included in the plan, such as changes in visitor opportunities and access, as well as improvements to alternative transportation, could result in impacts to visitor connections to park sites and communities. Therefore, this topic was retained for detailed analysis.</p>	<p>National Environmental Policy Act</p>
<p>Functionality of the</p>	<p>Actions included in the plan, such as changes in visitor access, alternate modes of</p>	<p>National Environmental Policy</p>

Impact Topic <i>(Retained or Dismissed from further analysis)</i>	Rationale	Relevant Law, Regulation, or Policy
Transportation System <i>Retained</i>	transportation, and transportation system assets, could result in impacts to the functionality of the parks' transportation system. Therefore, this topic was retained for detailed analysis.	Act
NPS Operations Facilities <i>Retained</i>	Support facilities necessary to house, transport, inform, and serve visitors and staff require proper planning, design, programming, construction, operation and maintenance. Facilities should be cost-effective, integrate sustainable design, and consider impacts on the landscape, environs, and resources of the parks. Actions included in the plan, such as the type and location of NPS operations facilities for maintenance and law enforcement, could result in impacts to NPS operations and management. Therefore, this topic was retained for detailed analysis.	NPS Organic Act; DOI Departmental Manual; NPS <i>Management Policies 2006</i> ; Director's Order 80
Staffing <i>Retained</i>	Actions included in the plan, such as changes in visitor opportunities, facility use, resource management, and interpretation/education, could result in impacts to NPS staffing. Therefore, this topic was retained for detailed analysis.	NPS Organic Act; DOI Departmental Manual; NPS <i>Management Policies 2006</i> ; Director's Order 80

NATURAL RESOURCES – GOLDEN GATE NATIONAL RECREATION AREA

3

4 INTRODUCTION

5 The Golden Gate National Recreation Area (GGNRA) is one of the largest urban national
6 parks in the world. The recreation area’s 75,398 acres of land and water extend from
7 Tomales Bay in Marin County south into San Mateo County, encompassing 75 miles of
8 bay and ocean shoreline. Golden Gate National Recreation Area is rich in natural
9 resources; it is comprised of 19 separate ecosystems and is home to more than 1,250 plant
10 and animal species. With 80 sensitive, rare, threatened, or endangered species, Golden
11 Gate National Recreation Area ranks fourth among all units in the national park system in
12 the number of federally protected and threatened species found within the park.

13 Numerous special status designations emphasize the collective importance of Golden
14 Gate National Recreation Area and Point Reyes National Seashore (PRNS) as areas of
15 biological significance. The Nature Conservancy has listed this region as one of the six
16 most biologically significant areas in the United States; it is a biodiversity “hot spot”
17 recognized by The Nature Conservancy and targeted by the global conservation
18 community as key to preserving the world’s ecosystems. Conservation International
19 describes this portion of central California as one of the top 25 hotspots and the most
20 threatened of all biologically rich terrestrial regions in the world. Point Reyes National
21 Seashore and Golden Gate National Recreation Area are jointly designated as a
22 Biosphere Reserve, one of 411 reserves designated by the United Nations Educational,
23 Scientific, and Cultural Organization’s (UNESCO) Man and the Biosphere Program to
24 provide a global network representing the world’s major ecosystem types (NPS 2007a).

25 Golden Gate National Recreation Area is part of the California Floristic Province
26 (characterized by Mediterranean vegetation) and a zone of overlap of marine provinces
27 (Californian and Oregonian) leading to a wide diversity of terrestrial and aquatic habitats.
28 From the tip of Tomales Point to the southernmost areas of Sweeny Ridge and Phleger
29 Estate, the natural communities of the recreation area support a diversity of habitats:
30 marine environments, coastline, sea cliffs and sand dunes, mud flats and salt marshes,
31 chaparral and coastal scrub, grasslands, redwood forests, and oak woodlands. The
32 recreation area spans two of the largest estuaries on the west coast: Tomales Bay and San
33 Francisco Bay. Aquatic associated habitats include ephemeral and perennial freshwater
34 streams, groundwater seeps and springs, seasonal wetlands, tidal and brackish saline
35 wetlands grading into estuaries, and the marine environment (NPS 2007a).

36

37 ALCATRAZ ISLAND

38 Alcatraz Island is a unique part of Golden Gate National Recreation Area. Accounts of
39 early explorers describe the island as having little plant life and covered with bird guano.
40 Construction of the Civil War military fort and later the federal penitentiary changed the

1 landscape significantly, sharpening the incline of the cliffs and flattening the slopes. Few
2 plants are native to Alcatraz Island and most of the existing plants are a result of prison
3 gardens or other means of importation, including soils brought from Angel Island during
4 the fort construction. Since the closure of the prison, many bird species have made the
5 island home.

6

7 **PHYSICAL RESOURCES**

8 **Air Quality**

9 Section 118 of the 1963 Clean Air Act (42 U.S.C. 7401 et seq.) requires a national park
10 unit to meet all federal, state, and local air pollution standards. Golden Gate National
11 Recreation Area and Muir Woods National Monument are in Class II air quality area
12 under the Clean Air Act, as amended. A Class II designation indicates the maximum
13 allowable increase in concentrations of pollutants over baseline concentrations of sulfur
14 dioxide and particulate matter as specified in Section 163 of the Clean Air Act. Further,
15 the Clean Air Act provides that the federal land manager has an affirmative responsibility
16 to protect air quality-related values (including visibility, plants, animals, soils, water
17 quality, cultural resources, and visitor health) from adverse pollution impacts.

18 The Clean Air Act requires the Environmental Protection Agency to identify national
19 ambient air quality standards to protect public health and welfare. Standards were set for
20 the following pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂),
21 sulfur dioxide (SO₂), inhalable particulate matter less than 10 microns (PM₁₀) and less
22 than 2.5 microns (PM_{2.5}), and lead (Pb). These pollutants are designated criteria
23 pollutants because the standards satisfy criteria specified in the act. An area where a
24 standard is exceeded more than three times in three years can be considered a
25 nonattainment area.

26 The California Clean Air Act of 1988, as amended, sets ambient air quality standards that
27 are stricter than the federal standards and requires local air districts to promulgate and
28 implement rules and regulations to attain those standards. Under the act, California
29 Ambient Air Quality Standards (CAAQS) are set for all pollutants covered under national
30 standards, as well as vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing
31 particulates. If an area does not meet the California standards, it is designated as a state
32 nonattainment area.

33 In 1993, the Environmental Protection Agency adopted regulations implementing Section
34 176 of the Clean Air Act as amended. Section 176 requires that federal actions conform
35 to state implementation plans for achieving and maintaining the national standards.
36 Federal actions must not cause or contribute to new violations of any standard, increase
37 the frequency or severity of any existing violation, interfere with timely attainment or
38 maintenance of any standard, delay emission reduction milestones, or contradict state
39 implementation plan requirements. Federal actions that are subject to the general
40 conformity regulations are required to mitigate or fully offset the emissions caused by the
41 action, including both direct and indirect emissions that the federal agency has some
42 control over.

1 Golden Gate National Recreation Area and Muir Woods National Monument are in the
2 San Francisco Bay Area Air Basin, which consists of San Francisco, San Mateo, Santa
3 Clara, Alameda, Contra Costa, Napa, and Marin counties, as well as portions of Sonoma
4 and Solano counties. The Bay Area Air Quality Management District is the air quality
5 agency responsible for the entire basin. The agency monitors criteria pollutants
6 continuously at stations throughout the Bay Area.

7 Overall, air quality in the basin is better than in other urban areas of California despite
8 widespread urbanization and extensive industrial and mobile source (vehicular)
9 emissions. The Bay Area's coastal location and favorable meteorological conditions help
10 keep pollution levels low much of the year, primarily due to the area's relatively cooler
11 temperatures and better ventilation. However, when temperatures are hot and there are no
12 ocean breezes, levels of ozone and other pollutants can exceed federal and state air
13 quality standards.

14 The San Francisco Bay Area is designated a federal nonattainment area for ozone and a
15 state nonattainment area for ozone and inhalable particulate matter (PM₁₀ and PM_{2.5}).
16 Ozone is a principal component of smog. It is caused by the photochemical reaction of
17 ozone precursors (reactive organic compounds and nitrogen oxides). Ozone levels are
18 highest in the Bay Area during days in late spring through summer when meteorological
19 conditions are favorable for the photochemical reactions to occur, i.e., clear warm days
20 and light winds. (Source? Section added by P.Malone)

21 An air emissions inventory was conducted in 1999 to determine the origins,
22 compositions, and rates of emission of pollutants affecting park lands and resources. In
23 addition to Golden Gate National Recreation Area activities, the inventory included air
24 emissions associated with park partners and concessionaire operations and visitor
25 activities to the extent that data were available. Standardized emission factors and air
26 quality models from the California Air Resources Board (CARB) and the U.S.
27 Environmental Protection Agency (EPA) were used to develop emission levels for the
28 range of activities and facilities that can emit pollutants in Golden Gate National
29 Recreation Area (NPS 2005a).

30 Sources of air emission within Golden Gate National Recreation Area include all three
31 types identified by the Clean Air Act: stationary sources, area sources, and mobile
32 sources. Stationary sources can include fossil-fuel-fired space and water heating
33 equipment, backup generators, fuel storage tanks, paint and chemical usage, and
34 woodworking equipment. Area sources may include prescribed burning, campfires, and
35 bonfires. Mobile sources may include vehicles and other equipment operated within the
36 park by visitors, tour operators, Golden Gate National Recreation Area employees, and
37 concessionaire employees.

1 **Table 2: County Variation in Attainment Status, Demonstrated by Monitoring Station Data,**
 2 **2001-2003**

Pollutant	Redwood City San Mateo County		San Francisco San Francisco County		San Rafael Marin County	
	State Standard	Federal Standard	State Standard	Federal Standard	State Standard	Federal Standard
Ozone (1-hour)*	N	NA	A	NA	A	NA
Ozone (8-hour)	NA	NA	NA	NA	NA	NA
Carbon monoxide	A	A	A	A	A	A
Nitrogen dioxide	A	A	A	A	A	A
Sulfur dioxide	ND	ND	A	A	ND	ND
Particulate matter (PM ₁₀) (Max. 24-hour)	NA	A	N	A	NA	A

3 Source: BAAQMD Annual Bay Area Air Quality Summary

4 Notes:

5 A = Attainment, N = Nonattainment, U = Unclassified, NA = Not Applicable, ND = No data

6 *Attainment status is assigned only on an air-basin level. Though specific county monitors indicate
 7 attainment with NAAQS, all counties are included in the San Francisco Bay Area Air Basin, which is
 8 designated as nonattainment for 1-hour and 8-hour ozone national standards and for state
 9 standards for PM₁₀.

10

11 The emissions inventory included all lands and uses within the GMP planning area.
 12 Included in the inventory were all structures, vehicles, boats, and equipment used by the
 13 park, park partners, or concessionaires, such as the Hornblower that operates the ferry
 14 service to Alcatraz Island.

15 There are no air quality monitoring stations in operation for the coastal areas of the Bay
 16 Area Air Basin that are certain to represent air quality conditions within the park. A
 17 monitoring station at Fort Cronkhite in the Marin Headlands records levels of toxins
 18 present in the air as a by-product of manufacturing, such as acetone and benzene, and
 19 does not monitor for criteria pollutants. The closest monitoring stations to park lands that
 20 record levels of criteria pollutants are in the cities of San Rafael, Redwood City, and
 21 eastern San Francisco. The levels recorded at these stations, which are located in the
 22 midst of urban development, would be more representative of the cumulative levels of air
 23 pollutants in urbanized areas that contain heavily used roadways, urban and residential
 24 sources, and existing stationary sources throughout the air basin. Data collected at these
 25 stations can serve as very conservative estimates of ambient air quality affecting the park
 26 lands, which are largely coastal and generally upwind (based on prevailing wind
 27 direction) of local sources of Bay Area air emissions, but are still subject to pollutant
 28 problems, such as ozone, that have a more regional effect on air quality. However, the

1 actual ambient pollutant concentrations within the park lands are anticipated to have
2 lower background levels of these pollutants because the project area and surroundings are
3 more remote and generally upwind of roadways and other emission sources (NPS 2005a).

4

5 **Carbon Footprint**

6 A “carbon footprint” is a measure of the impact human activities have on the
7 environment in terms of the amount of greenhouse gases produced, and is measured in
8 units of carbon dioxide. The greenhouse effect is a natural phenomenon that keeps the
9 earth’s temperature stable at an average of 60° F. Without this natural warming effect our
10 planet would be uninhabitable at an average temperature of 14° F. However, human
11 actions are disturbing this balance through over-production of large amounts of two main
12 greenhouse gases, carbon dioxide (CO₂) and methane (CH₄). The increase in greenhouse
13 gases is causing an overall warming of the planet, commonly referred to as *global*
14 *warming*. The term *climate change* describes the variable consequences of global
15 warming over time.

16 The National Park Service has a goal of reducing its contribution to global warming and
17 climate change through the reduction of emissions. To begin tracking the results of their
18 efforts, the park staff inventoried its emissions in 2006 using the Climate Leadership in
19 Parks (CLIP) tool developed by the National Park Service and the EPA. The CLIP tool
20 converts emissions of various greenhouse gases into a common “metric tons of carbon
21 equivalent” unit, which provides a basis for comparison among gases and simplifies
22 reduction tracking. The conversion of a greenhouse gas to metric tons of carbon
23 equivalent (MTCE) is based upon how strongly that particular gas contributes to the
24 greenhouse effect, and how many tons of carbon emission would have the same effect.

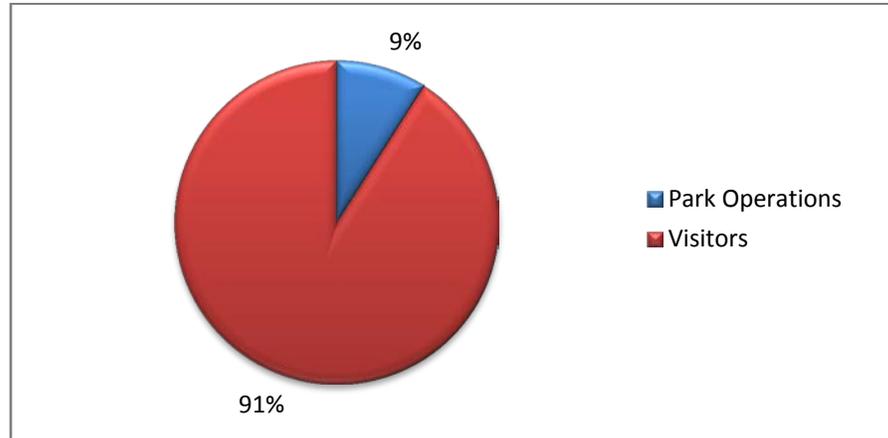
25 The emissions inventory (NPS 2007c) then looked at the relative input of various sectors:
26 stationary combustion (building furnaces, dryers, electrical generators, hot water heaters),
27 purchased electricity, mobile combustion (vehicles, buses, heavy equipment), wastewater
28 treatment, and solid waste disposal (garbage transportation and decomposition) for
29 Golden Gate National Recreation Area and Muir Woods National Monument. Based on
30 the emissions inventory completed in 2006, emissions from visitors (mobile combustion
31 primarily from personal automobile use) represents 91% of gross emissions at Golden
32 Gate National Recreation Area and Muir Woods National Monument and emissions from
33 park operations represents 9% (see figure 2).

34 Figure 3 shows how the National Park Service’s emissions from park operational
35 activities are distributed among sectors when visitor emissions are excluded.

36 Visitor emission totals consist of an approximation of how much gasoline is consumed
37 while driving to various park locations. Using annual visitor vehicle counts to many of
38 the different locations in the park, the total number of miles driven by visitors was
39 approximated (based on the assumption that they were driving from somewhere in the
40 Bay area). The resulting total vehicle miles driven by visitors was put into the CLIP tool.
41 The CLIP tool then used assumptions about the different types of cars and the miles per
42 gallon each had to determine approximate fuel consumption.

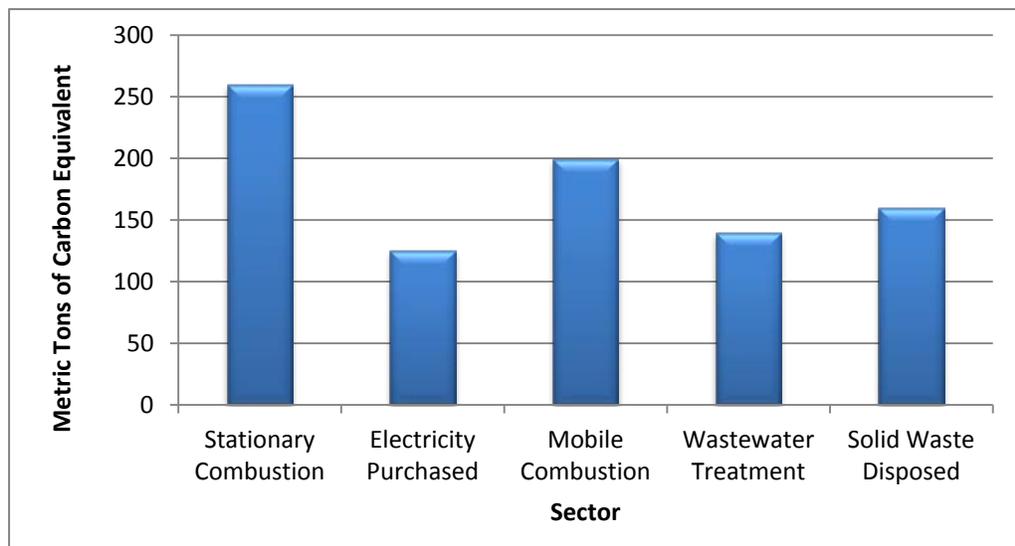
43

1 **Figure 1: Gross Emission for Golden Gate National Recreation Area**



2
3 Source: Golden Gate Climate Change Action Plan, August 2007

4
5
6 **Figure 2: 2006 Gross Park Emissions by Sector, Excluding Visitors**

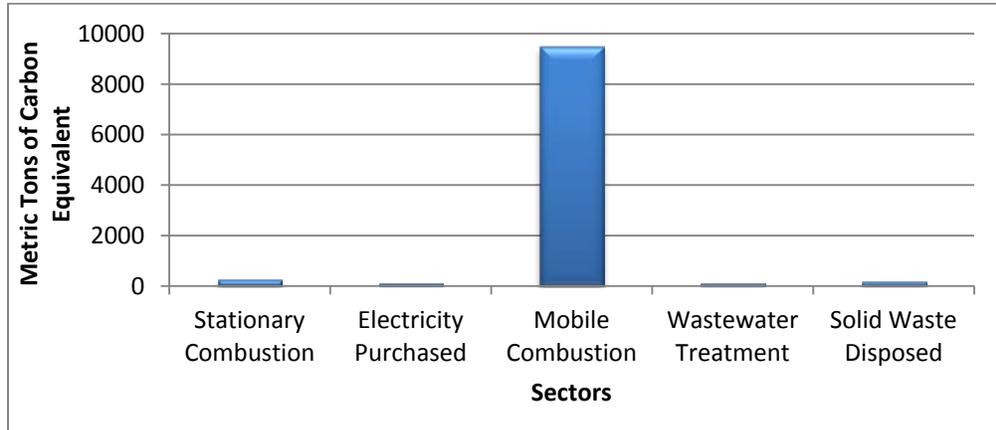


7
8 Source: Golden Gate Climate Change Action Plan, August 2007

9
10 Figure 3 shows how the sectors of emissions are distributed when visitor emissions are
11 included. The vast majority of emissions at Golden Gate National Recreation Area are
12 attributable to visitor mobile combustion (vehicles).

13
14

1 **Figure 3: 2006 Gross Park Emissions by Sector, Including Visitors**



2
3 Source: GOGA Climate Change Action Plan, August 2007

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In 2008, Golden Gate National Recreation Area’s emissions inventory was updated and included the following emissions statistics for Golden Gate National Recreation Area (including parklands in the three-county area and Alcatraz Island) and Muir Woods National Monument. These data represent existing baseline conditions.

10 **Table 3: Emission Statistics for Golden Gate National Recreation Area**

	Marin County	San Francisco County	San Mateo County	Alcatraz Island	Muir Woods
Statutory combustion	523	148	No Data Available	632	5
Purchased electricity	385	382	No Data Available	0	17
Mobile combustion	1047	1419	No Data Available	1167	4873
Wastewater treatment	263	0	No Data Available	31	1
Solid waste	332	472	No Data Available	0	50
Gross emissions	2551	2422	No Data Available	1830	4946

1 **Soils and Geologic Resources and Processes**

2 **Soils**

3 Most of the soils within Golden Gate National Recreation Area belong to the following
4 complexes: Blucher-Cole, Centissima-Barnabe, Cronkhite-Barnabe, Dipsea-Bamabe,
5 Felton Variant-SoulaJule, Franciscan, Gilroy-Gilroy Variant-Bonnydoon Variant,
6 Henneke stony clay loam, Kehoe, Rodeo Clay Loam, and Tamalpais-Barnabe Variant
7 (USDA, Soil Surveys for Marin, San Francisco, and San Mateo counties). All of these
8 soils are susceptible to sheet and rill erosion when disturbed or exposed. The
9 susceptibility to wind erosion is generally low. In general, these soils are characterized by
10 slow to moderate permeability, rapid storm water runoff, and a high hazard of soil
11 erosion, soil creep, and occasional land sliding. An aerial view of the park area landscape
12 makes clear the threats posed by erosion. Coastal waves rhythmically crash against the
13 shoreline; deep, long gullies originate at old roads; heavily used areas are devoid of
14 vegetation; undesignated social trails crisscross through the natural areas; and landslides
15 or slumps exist in the small valleys (NPS 2005a).

16 Alcatraz Island is composed of consolidated sandstone sediments, and is the remainder of
17 a mountain that has been highly eroded. Much of the soil on the island is a result of
18 importation from Angel Island during the fort construction or soil amendments added
19 over the years to support the various gardens and landscape areas.

20 **Paleontological Resources**

21 Fossils of tropical and subtropical species of zooplankton (radiolarian) have been found
22 in **chert** of the Marin Headlands. Mollusks fossils (ammonite, belemnite, bivalve) have
23 also been found here. Bivalve mollusk fossils are found on Alcatraz Island, and Mori
24 Point is a source of zooplankton (radiolarian, foraminifera). The area near Devil’s Slide
25 includes zooplankton (foraminifera), mollusk (gastropod, bivalve), crustacean, and sea
26 star-like (echinoid) fossils. Fort Funston includes mollusk (gastropod, bivalve), sand
27 dollar, crustacean, marine worm (polychaete), woolly mammoth, giant ground sloth,
28 mastodon, horse, camel, canid and split-toed ungulate fossils. Fossils found on the
29 Phleger Estate include mollusk (freshwater gastropod, bivalve), unnamed vertebrates, and
30 plants (O’Herron 2008).

31 **Shoreline Processes**

32 The park’s shoreline is made of three distinct shoreline types. The Pacific Ocean
33 shoreline is characterized by steep, rocky headlands, such as Tennessee Point, Point
34 Bonita, and the Rodeo Beach sand spit that forms Rodeo Lagoon. The Golden Gate
35 Channel shoreline is characterized by rocky headlands, smaller sand and gravel beaches,
36 and strong tidal currents. The third zone is the San Francisco Bay shoreline, which
37 includes Fort Baker’s Horseshoe Bay (NPS 2007a). **what are its characteristics?**

38 Alcatraz Island is composed of fractured sandstone and is somewhat susceptible to wave-
39 generated erosion.

40

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1 **Coastal Vulnerability and Sea-Level Rise**

2 Sea levels are predicted to rise 13-20 feet over the next 100 years as a result of global
3 warming, inundating low-lying islands and threatening coastal cities and harbors
4 worldwide (Overpeck et al. 2006). While this forecast has shocking global implications,
5 it raises equally serious concern for many U.S. national parks.

6 The U.S. Geological Survey (USGS), in cooperation with the National Park Service,
7 completed an assessment in 2005 (Pendleton, Thieler and Williams 2005) of Golden Gate
8 National Recreation Area's vulnerability to sea-level rise using a tool called the Coastal
9 Vulnerability Index (CVI). The CVI provides insight into the relative potential of coastal
10 change due to future sea-level rise.

11 The CVI allows six variables (geomorphology, shoreline change, regional coastal slope,
12 relative sea-level rise, mean significant wave height, and mean tidal range) to be related
13 in a quantifiable manner that expresses the relative vulnerability of the coast to physical
14 changes due to future sea-level rise. The CVI highlights those regions where the physical
15 effects of sea-level rise might be the greatest.

16 The most influential variables in the CVI are geomorphology, coastal slope, and mean
17 significant wave height; therefore, these may be considered the dominant factors
18 controlling how Golden Gate National Recreation Area will evolve as sea level rises.

19 While climate change data reflect long-term increases in sea levels, there may be specific
20 sites within Golden Gate National Recreation Area that could be more vulnerable to
21 rising sea levels even within the lifespan of this general management plan, particularly if
22 the melting of the polar ice caps increases more rapidly than expected.

23 The colored shoreline depicted in Figure 4 represents the relative coastal vulnerability
24 index (CVI) determined from the six variables. The very high vulnerability shoreline is
25 generally located along sandy beaches where significant wave heights are highest and
26 regional coastal slope is shallow, including sites like Ocean Beach, Fort Mason, Land's
27 End, and Fort Funston. The lower vulnerability shoreline is located along rock cliffs
28 mostly along the northern part of Golden Gate National Recreation Area where wave
29 heights are lower and coastal slope is steep.

30 Of the 59 miles evaluated at the park, 50% of them were classified as having high (26%)
31 or very high (24%) vulnerability, with another 26% classified as having moderate
32 vulnerability (Pendleton, Thieler and Williams 2005). This information raises serious
33 concern, since the most vulnerable shorelines are located on the southern peninsula where
34 the largest concentration of humans and built facilities exist. This area also includes
35 heavily visited beaches including Ocean Beach, China Beach, and Baker Beach.

36 Predictions of sea-level rise are useful in determining what resources and facilities could
37 be affected. Based on data obtained from the Pacific Institute (2009) and the USGS,
38 combined with modeling of 100-year floodplains, figure 6 illustrates what areas would be
39 inundated by rising seas. (Need source citations- info added by P. Malone)

40

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1 **Figure 4: Relative Coastal Vulnerability**



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- 1 **Figure 5: Sea Level Rise Map**
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- 4 **Insert park's sea-level rise map**
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1 **Water Resources and Hydrologic Processes**

2 Water resources in Golden Gate National Recreation Area include springs, streams,
3 ponds, lakes, wetlands, lagoons, the San Francisco Bay, and the Pacific Ocean. Many
4 significant watersheds are located wholly or partially within the park. From north to
5 south, the major watersheds are Bolinas Lagoon, Redwood Creek, Tennessee Valley (Elk
6 Creek), Rodeo Lagoon (including Gerbode Valley subwatershed), Nyhan Creek, Lobos
7 Creek, Milagra and Sweeney Ridges, San Pedro Creek, West Union Creek, and the San
8 Francisco watershed lands in San Mateo County (see Figure  Watershed map). Many
9 smaller watersheds drain the steep coastal bluffs directly into the San Francisco Bay or
10 Pacific Ocean.

11 The National Park Service has been monitoring water quality to varying degrees within
12 these aquatic systems. Most water quality sampling to date has focused on specific sites
13 with known or suspected water quality impacts, including beach water quality
14 monitoring. The National Park Service is presently designing a more comprehensive
15 monitoring program that should identify any existing impacts and serve as baseline data
16 to determine future impacts. For the lands in the southern part of the park (San Francisco
17 and San Mateo counties), this work will also include an inventory of the largely unknown
18 water resources. The monitoring will be coordinated through the San Francisco Bay Area
19 network of regional national park sites (NPS 2005a).

20 **Freshwater Resources**

21 ***Surface Water***

22 The watersheds in the park in the ratio of forest cover to scrub vegetation.

23 Watersheds in southern Marin County, such as Rodeo Lagoon and Tennessee Valley, are
24 dominated by scrub and grassland vegetation with the majority of the trees in the riparian
25 zone. These watersheds also have extensive stream and wetland complexes throughout
26 their valley floors. Other watersheds, such as the Redwood Creek watershed, Bolinas
27 Lagoon watershed, and the San Pedro Creek watershed, have denser forests beyond the
28 riparian zone. These watersheds have steeper slopes and narrower valleys, and thus
29 restrict the extent of wetlands (NPS 2005a).

30 Freshwater resources include streams, lakes, and freshwater wetlands. Most of the rivers
31 in the park are not large and their tributaries are frequently ephemeral. The overall
32 condition of these resources results from more than a century of intensive human uses,
33 combined with the instability associated with soil types and the highly active San
34 Andreas Fault. The effects of past land use practices (development, logging, agriculture,
35 and grazing) have changed watershed conditions and reduced habitat for many aquatic
36 invertebrates, fish, and amphibians. Loss of native perennial vegetation, soil compaction
37 and loss, hillside trailing, gulying, and incision of swales and meadows have changed the
38 runoff patterns and reduced the capacity of the watershed to attenuate pollutant loading
39 and surface runoff to streams. Dam construction, channelization, water diversions, and
40 the increased water demands of growing urban areas have dramatically diminished the
41 size of many streams and reduced instream and riparian species diversity. Although land
42 use practices having lesser impacts are being increasingly adopted by landowners, present
43 land use continues to influence water quality conditions within many watersheds (NPS
44 2007a).

1 Macroinvertebrates are commonly used as indicators of water quality and functional
2 status of freshwater streams, but to date macroinvertebrate sampling has been infrequent
3 and inconsistent across sites. Coho salmon have been more consistently monitored and
4 their use as an indicator of stream condition is being evaluated. Positive signs recently
5 observed are the recolonization of Pine Gulch Creek by coho salmon and population
6 increases in Olema Creek (NPS 2007a).

7 Ponds and swales are also extremely important aquatic resources. As mentioned earlier,
8 some of the largest endangered red-legged frog populations are in Point Reyes National
9 Seashore and northern Golden Gate National Recreation Area where there are more than
10 120 breeding sites with a total adult population of several thousand frogs. Most of the
11 breeding sites are artificial stock ponds constructed on lands that have been grazed by
12 cattle for 150 years. There are also fairly large populations in some of the coastal
13 drainages in San Mateo County just south of San Francisco in Golden Gate National
14 Recreation Area (NPS 2007a).

15 Due to its relatively small size, Alcatraz Island does not have streams—only ephemeral
16 flows due to rainfall.

17 **Marin County Watersheds.** Most Marin County watersheds drain to the Pacific Ocean.
18 Watersheds relevant to park lands include Bolinas Lagoon, Redwood Creek, Marin
19 Highlands, and others. The Bolinas Lagoon watershed extends from the Bolinas Ridges
20 west to Inverness Ridge. Two-thirds of this watershed is in public ownership. Streams
21 within this watershed are steep and flow through the highly erodible Franciscan
22 Complex. The Redwood Creek watershed extends from the peaks of Mount Tamalpais,
23 through Muir Woods National Monument, to the Pacific Ocean at Muir Beach. Ninety-
24 five percent of the watershed is owned and managed by public agencies. Several
25 threatened animal species also occur in the watershed, including coho salmon, steelhead,
26 California red-legged frog, and the northern spotted owl (*Strix occidentalis caurina*).

27 The Marin Headlands drain into Rodeo Lagoon, which provides marine habitat, water
28 recreation, saltwater habitat, and wildlife habitat. Rodeo Lagoon is a significant
29 wetland/estuarine resource that provides important habitat for marine birds and other
30 species (NPS 2005a).

31 **San Francisco City and County Watersheds.** The majority of the watersheds in San
32 Francisco are highly urbanized, and their boundaries have been modified by storm
33 drainage projects and other urban infrastructure. The Park Service manages lands in San
34 Francisco draining to San Francisco Bay, the Golden Gate Channel, and the Pacific
35 Ocean. Tennessee Hollow and Lobos Creek, both of which are within the Golden Gate
36 National Recreation Area and the Presidio of San Francisco (Presidio), remain in a
37 relatively unurbanized state and are significant water resources in the park. The
38 Tennessee Hollow stream, in the Presidio East watershed, is the main fresh water source
39 for the Crissy Field marsh, a recently completed wetland restoration project. Lobos
40 Creek, in the Presidio West watershed, is the main water supply for the Presidio (NPS
41 2005a).

1 **Figure 6: Golden Gate National Recreation Area Watersheds**

2 **Insert Watershed Map**

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1 **San Mateo County Watersheds.** The watersheds in San Mateo County have not been
2 comprehensively studied due to piecemeal land management by various agencies and
3 private holdings. The watersheds that wholly or partly contain park land include Milagra,
4 between Sweeney and Milagra; Sweeney; San Pedro Creek; Crystal Springs (part of the
5 larger San Francisco watershed); and West Union/San Francisquito Creek. The 23-
6 square-mile San Francisco watershed is owned and managed by the San Francisco Public
7 Utilities Commission and is part of the water supply storage for the City and County of
8 San Francisco. This watershed includes San Andreas Lake, Crystal Springs, Pilarcitos
9 Lake, and a portion of the Pilarcitos Creek watershed. The San Pedro Creek watershed
10 drains portions of the San Francisco watershed lands, Picardo Ranch, and portions of
11 Devils Slide. The West Union Creek watershed contains a tributary to the Searsville Lake
12 that drains the Phleger Estate at the south end of Golden Gate National Recreation Area
13 (NPS 2005a).

14 **Groundwater**

15 **Marin County.** The underlying Franciscan bedrock is relatively impermeable in Marin
16 County, creating a perched water table. Numerous springs throughout the watershed feed
17 Rodeo Creek well into the summer months. The total volume of water stored in the
18 aquifer is unknown. No wells are in operation within NPS-managed lands in Marin
19 County. The water table is tidally influenced in the lower areas such as Fort Baker (NPS
20 2007b).

21 **San Francisco County.** Groundwater sources in San Francisco County are made up of
22 shallow unconsolidated alluvium underlain by less permeable bedrock of the Franciscan
23 Complex. Average precipitation is approximately 24 inches per year, but due to high
24 impervious cover rates, little infiltration occurs. The primary water-bearing formations
25 are comprised of unconsolidated sediments and include alluvial fan deposits, beach and
26 dune sands, undifferentiated alluvium, and artificial fill. Groundwater within San
27 Francisco County is subject to high concentrations of nitrates and elevated chloride,
28 boron, and total dissolved solids concentrations. High nitrate levels are attributed to
29 groundwater recharge from sewer pipe leakage and possibly to fertilizer introduced by
30 irrigation return flows. Elevated chloride and TDS levels are most likely due to a
31 combination of leaky sewer pipes, historic and current seawater intrusion, and connate
32 water. Current groundwater usage in the City is primarily for irrigation of parks and golf
33 courses.

34 **San Mateo County.** Much of San Mateo County is part of the Santa Clara Valley
35 Groundwater Basin, with portions in the San Francisco basin. Santa Clara Valley
36 groundwater sources include 1) coastal marine terrace or stream valley alluvial deposits
37 where groundwater is stored in loose, unconsolidated, coarse-grained sand, and 2) upland
38 granitic bedrock of the Santa Clara Formation, where groundwater is stored in weathered
39 rock openings and in rock fractures. The granite bedrock has limited storage capacity, but
40 the alluvial deposits are good sources of groundwater. Over the long term, the marine
41 terraces appear to be in hydrological balance; however, in dry years, pumping has
42 reduced the water table to near sea level—increasing the risk of salt water intrusion. The
43 water is slightly alkaline with a mean pH value of 7.3 based on 20 samples. Hardness for
44 the 20 wells sampled averaged 471 milligrams per liter (mg/L) as CaCO₃, in excess of
45 the 180 mg/L minimum value for water to be classified as very hard (CWA 2004).

1 ***Floodplains***

2 Floodplains exist along streams and creeks throughout Golden Gate National Recreation
3 Area and Muir Woods National Monument. In Marin County, 100-year floodplains are
4 located along Redwood Creek and Rodeo Creek. Park facilities at Stinson Beach (parking
5 lots and picnic areas) and Muir Beach (parking lot and Pacific Way) are in the floodplain.
6 In San Mateo County, 100-year floodplains are located along Denniston Creek, San
7 Vicente Creek, and the Middle Fork of San Pedro Creek. The lower stables at the Rancho
8 Corral de Tierra property are located in the San Vicente Creek floodplain.

9 ***Water Quality***

10 The size and nature of the park (including high visitor use, the urban interface, and
11 multitude of land uses) create several issues related to water quality. Accelerated erosion
12 due to roads, trails, and other uses and developments threatens the sediment balance and
13 ecological health of several watersheds. Grazing is no longer allowed on NPS-managed
14 lands in Golden Gate National Recreation Area (NPS 1999b), but some of the impacts
15 remain. Bacteria and nutrient inputs from equestrian operations, pet waste, agricultural
16 operations, and potentially from sewer and septic systems can affect wildlife and public
17 health as well as the overall ecological balance of water resources. Alteration of channels
18 (including dams and culverts) affects the ecological health of park watersheds. These
19 primary issues occur to varying extents within multiple park watersheds (NPS 2005a).

20 Many park water quality issues are related to facilities and structures. A roads and trails
21 inventory exists and many structures are documented in the maintenance division's
22 facilities database. However, a comprehensive inventory of park facilities and structures
23 (including dams, culverts, and outfalls) has not been conducted (NPS 2005a).

24 Work is in progress to document facilities, roads and trails, and other water quality
25 threats more thoroughly. For example, for the Redwood Creek watershed, a sediment
26 budget study and a report of all sediment sources in the watershed were completed. Trail
27 maps are being updated for the park and erosion surveys continue throughout the Marin
28 Headlands. A dam inventory will be included in an upcoming "Water Quality Data
29 Inventory and Analysis Report." Culvert mapping has occurred in Rodeo Valley (NPS
30 2005a).

31 Golden Gate National Recreation Area has a long history of water quality problems due
32 to its proximity to urban and rural land uses. The park's surface waters and groundwater
33 provide important beneficial uses that serve as a basis for establishing water quality
34 objectives and discharge prohibitions by the California State Water Quality Control
35 Board and the EPA. These "beneficial" uses include agricultural supply, cold freshwater
36 habitat, fish migration, municipal and domestic water supply, preservation of rare and
37 endangered species, contact water recreation, noncontact water recreation, shellfish
38 harvesting, fish spawning, warm freshwater habitat, and wildlife habitat. Additional
39 beneficial uses for the Pacific Ocean include commercial and sport fishing, industrial
40 service supply, and marine habitat. Some of the external issues facing the park have to do
41 with balancing the historical and cultural traditions of ranching and dairy establishments
42 with the very high water quality needed for endangered species such as coho salmon,
43 steelhead trout, California freshwater shrimp, and California red-legged frogs. In the
44 park, particularly in areas south of the Golden Gate, the primary issues are storm water
45 discharge and legacy contaminants from abandoned military installations (NPS 2007a).

1 According to the California State Water Quality Control Board¹, eight areas (three
2 creeks, three bays, and two beaches are listed as impaired according to the EPA’s list of
3 impaired waters (the 303d List) (see table 3). The San Francisco Regional Water Quality
4 Control Board (SFRWQCB) has established a timeline for the development of total
5 maximum daily loads (TMDL) associated with the highest priority impairment listings.
6 The TMDL process for Tomales Bay watershed pathogens was completed in 2005
7 (SFRWQCB, 1995). The National Park Service is currently working with the state and
8 local agencies to develop and implement monitoring and enhancement efforts to address
9 additional impairment issues. Additional water quality programs are associated with the
10 three counties within Region 2: Marin, San Francisco, and San Mateo. Water districts and
11 some watershed groups also monitor water quality (NPS 2007a).

12 Near-shore water quality has rarely been monitored by the parks, while freshwater and
13 beach resources are measured principally in areas where problems have been identified.
14 This lack of a probabilistic (randomized) water sampling program means that
15 generalizations should be made with care; a broad summary of park water quality, or
16 even watershed water quality, is likely to overstate problems and overemphasize
17 freshwater resources (NPS 2007a).

18 Water quality monitoring has been conducted in Redwood Creek and tributaries
19 (including Kent Creek, Camino del Canyon, Banducci Tributary, Green Gulch, and
20 Golden Gate Dairy Tributary) at numerous locations throughout the years. Several data
21 sets exist for discrete (i.e., short-term, focused) monitoring projects. For example,
22 monitoring by the National Park Service in the Redwood Creek watershed was conducted
23 in 1986, 1988, 1990-1991, and 1993-1996. Much of the water quality monitoring within
24 the park has focused on lower Redwood Creek due to concerns related to nutrient and
25 bacteria inputs in this locale, including recent data related to the Golden Gate Dairy and
26 Big Lagoon (NPS 2005a).

27 **Marin Headlands/Redwood Creek/Stinson Beach/Bolinas Lagoon Areas.** Short-term
28 data sets also exist for Rodeo Creek and Tennessee Valley (1994-1996). Rodeo Creek
29 and Tennessee Valley were monitored along with Green Gulch between 1998 and 2001
30 as part of intensive sampling related to stable operations and other potential sources of
31 bacteria and nutrients. Parameters typically monitored included flow (though flow data
32 has been sporadic), pH, temperature, dissolved oxygen, conductivity, BOD (Biological
33 Oxygen Demand), salinity, TSS (Total Suspended Solids), fecal and total coliforms,
34 nitrates, ammonia, phosphates, **Total P, metals** (emphasis on copper), MBAS (Methyl
35 Blue Activated Substances), and chloride. Not all parameters were monitored at all sites
36 (NPS 2005a).

37

¹ The State Water Quality Control Board's mission is to preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. There are nine regional boards in the state. The San Francisco Bay Regional Water Quality Control Board (Region 2)'s jurisdiction covers the area of the two parks assessed in this report, the Point Reyes National Seashore and the Golden Gate National Recreation Area.

1 **Table 4: Impaired water bodies within Point Reyes National Seashore and Golden Gate**
 2 **National Recreation Area as indicated from the 2006 303d list**

Water Body	Park Unit	Pollutant
Lagunitas Creek	Point Reyes NS, Golden Gate NRA	Sediment, Nutrients
Richardson Bay	Golden Gate NRA	High Coliform, Chlordane, DDT, Dieldrin, Dioxin, Furan compounds, Mercury, PCBs, Exotic Species
San Francisco Bay	Golden Gate NRA	Chlordane, DDT, Dieldrin, Mercury, PCBs, PAHs, Nickel, Furan compounds, Exotic Species, Dioxin, Selenium
San Francisquito Creek	Golden Gate NRA	Sediment
San Pedro Creek	Golden Gate NRA	High Coliform
Tomales Bay	Pointe Reyes NS, Golden Gate NRA	Sediment, Nutrients, Mercury
Pacific Ocean at Baker Beach	Golden Gate NRA	Indicator Bacteria
Pacific Ocean at Muir Beach	Golden Gate NRA	Indicator Bacteria

3 Source: SFWQCB 2009 adapted from 2006 CWA Section 303d List

4

5 Consultants, the United States Geological Survey (USGS), and other entities have also
 6 conducted monitoring. For example, the Stinson Beach County Water Agency currently
 7 monitors Easkoot Creek for fecal coliforms and nutrients. Limited monitoring has also
 8 been conducted in Oakwood Valley and Nyhan Creek as part of an overall storm water
 9 monitoring project that includes Redwood Creek, Tennessee Valley, and Rodeo Creek
 10 (NPS 2005a).

11 Flow monitoring by various entities, including the National Park Service, the USGS,
 12 local universities, and consultants, has also been conducted. Flow monitoring sites have
 13 typically corresponded with water quality monitoring sites and include the Redwood
 14 Creek watershed (including Camino del Canyon, Kent Creek, Banducci Tributary, and
 15 Green Gulch Creek) as well as Easkoot Creek, Rodeo Creek, and Tennessee Valley. The
 16 USGS also monitored sediment and stream flow in Audubon Canyon and Morses Creek
 17 (near Bolinas) between 1967 and 1969. UC Berkeley monitored Lone Tree Creek (south
 18 of Stinson Beach) between 1972 and 1974. Stream gauges were installed by the National
 19 Park Service at Redwood Creek (Highway 1 Bridge) and Easkoot Creek. Because of high

1 toxic nutrient loads, algal blooms have occurred in Rodeo Lagoon. In addition to nutrient
2 issues, Rodeo Lagoon sediments may contain elevated amounts of copper from copper
3 sulfate (algaecide) treatment (NPS 2005a).

4 **San Francisco and San Mateo Counties.** Water quality monitoring has been conducted
5 periodically at the Presidio for several years. Until very recently, however, no monitoring
6 of surface water had been conducted by the National Park Service in the southern Golden
7 Gate National Recreation Area lands.

8 At Lobos Creek in the Presidio, the Urban Watershed Project (UWP)—a nonprofit
9 group—has conducted fecal coliform monitoring through a contract with the Presidio.
10 The City and County of San Francisco also recently conducted monitoring in Lobos
11 Creek. Limited sampling of Lobos Creek was also conducted through the Environmental
12 Remediation Program. Likewise, basic water quality parameters have been collected in
13 Tennessee Hollow by UWP, and by the Park Service at the Crissy Field marsh. Some
14 limited water quality monitoring has been conducted within the West Union/San
15 Francisquito Creek watershed (West Union Creek is located within this watershed), but
16 no monitoring has been conducted on NPS lands. The San Francisquito Creek Watershed
17 Council is actively involved in management and monitoring of this watershed. Through
18 the Watershed Council, consultants have monitored the Bear Creek watershed (including
19 West Union Creek). However, no sites have been located within Phleger Estate or the
20 adjacent county park (NPS 2005a). San Francisquito Creek is listed on the Section 303d
21 list as being impaired by sediment. Concerns in West Union Creek, a San Francisquito
22 Creek tributary within Phleger Estate, include erosion and runoff from trails. Landslides
23 and significant bank erosion have been observed (NPS 2005a).

24 Issues in Milagra, Sanchez, and Calera creeks are mostly unknown due to the lack of
25 water quality data. However, suspected issues in these urban creeks include fertilizer or
26 pesticide runoff from lawns and a golf course. In addition, pet waste, oil and chemical
27 runoff from roads, and bacteria and nutrient inputs from leaky sewer pipes are also
28 suspected concerns (NPS 2005a).

29 **Marine Resources**

30 ***Marine Environment – Regional Overview***

31 The Golden Gate National Recreation Area coastal waters include coastal and marine
32 habitats of central and northern California, adjacent to Gulf of Farallones National
33 Marine Sanctuary (NMS) and Monterey Bay NMS. The area shares many other features
34 with the sanctuaries due to its proximity and the influence of similar currents, seasonal
35 upwelling, and weather patterns. Geological features include a broad continental shelf;
36 rocky shores; sandy beaches; coastal estuaries such as San Francisco Bay, Elkhorn
37 Slough, and Tomales Bay; offshore banks; and the sloping edges of the continental shelf,
38 dissected by deepwater canyons such as the Monterey Submarine Canyon (NMS, NOAA
39 2006).

40 This unique combination of oceanographic conditions and undersea topography make the
41 area rich and diverse in a variety of marine species, including a wide array of temperate
42 cold-water species and occasional influxes of warm-water species. The species diversity
43 is directly related to the diversity of habitats and oceanic conditions, which are described
44 in the following section, and the location of the sanctuaries within a broad transition zone

1 providing a complex gradient of changing environments in which the relative proportions
2 of species changes from north to south (NMS, NOAA 2006).

3 The species north of Point Conception, an area encompassing the entire study region and
4 extending right up through Washington State, are part of the Oregonian biogeographic
5 province. The relative amount and location of upwelling and downwelling and,
6 consequently, the amount of productivity seen along the coast, are affected by seasonal
7 weather patterns and the influence of the California and Davidson currents. The
8 distribution of each species in the ocean is determined by a multitude of factors,
9 including temperature, salinity, oxygen content, nutrient availability, current speed and
10 direction, species interaction, frequency of perturbation, and food availability (NMS,
11 NOAA 2006).

12 ***Habitats***

13 The nearshore marine environment includes bay and estuarine habitats created by
14 mudflats, tidal wetlands, and rocky shorelines; it extends through the intertidal to the
15 subtidal zone of the continental shelf. This shelf extends far from the coast; since
16 upwelling occurs near shore, the coastal zone offers a relatively shallow highly
17 productive habitat for fish, invertebrates, marine mammals, and seabirds. The subtidal
18 zone abuts the federally protected Gulf of the Farallones National Marine Sanctuary to
19 the north and the Monterey Bay National Marine Sanctuary to the south. The area is
20 considered a biological hot spot; data that is available for some species (seals,
21 invertebrates (abalone), fish (rockfish), and shorebirds) indicate that most populations are
22 slowly recovering from historic declines. Rocky and sandy substrates predominate with
23 kelp communities occurring in scattered areas predominantly along the Point Reyes
24 National Seashore and Golden Gate National Recreation Area coastlines north of San
25 Francisco Bay. Research on physical processes is underway with promising new
26 approaches for coastal benthic mapping, such as multibeam sonar, helping to elucidate
27 nearshore habitat complexity. This knowledge is important for resource assessments as an
28 aid to locate and predict species distributions (NPS 2007a).

29 Along the open coast, intertidal habitats are likely the most heavily impacted aquatic
30 areas. Despite park protection, these habitats are impacted by recreational activities
31 including boating, clamming, fishing, diving, and trampling. The principal water quality
32 threats include bacterial and nutrient pollution (ranches, dairies, septic and stormwater
33 discharges), occasional oil spills from offshore tankers, and legacy military landfills.
34 Though beach sampling and damage incident reports have identified many of these
35 problems, the extent of these impacts on intertidal organisms is not well studied (NPS
36 2007a).

37 **Intertidal Zone.** Intertidal habitat, by definition, is found between the lowest and highest
38 tidal level. This transitional area between sea and land is the strip of shore between the
39 uppermost surfaces exposed to wave action during high tides and the lowermost areas
40 exposed to air during low tides. Intertidal habitats vary in type of material and the degree
41 of exposure to surf. Bottom habitat types include those of fine mud, sand, gravel, shale,
42 cobble, boulders, and bedrock. Intertidal habitat within the Golden Gate National
43 Recreation Area includes rocky and sandy beaches (NMS, NOAA 2006).

1 The south side of Alcatraz Island contains a sheer rock wall that terminates on a narrow
2 rock reef about 10-15 m wide. This narrow intertidal reef extends for only a short
3 distance (about 200 m) but represents one of the few rocky reefs within the San Francisco
4 Bay. Other rocky intertidal portions of the island are comprised of riprap and rubble
5 similar to the shorelines of much of the San Francisco Bay.

6 **Subtidal and Nearshore Waters.** Subtidal and nearshore waters refer to the area from
7 the lowest low tide line to the point where the seafloor drops and the deeper offshore
8 waters begin. This is on the land side of the continental shelf slope transition. The
9 substrate can be sand, mud, or rock, providing essential habitat for various algae,
10 zooplankton, and phytoplankton species (NMS, NOAA 2006). The nearshore coastal
11 environment is highly variable along the parks' shorelines, with a complex spatial
12 distribution of marine resources due to diverse lithologies, active tectonic and
13 geomorphic processes, topographic relief, and dynamic nearshore currents. This physical
14 diversity coupled with high productivity results in an equally diverse distribution of
15 organisms (NPS 2007a).

16 Because the continental shelf extends far from the coast and upwelling occurs nearshore,
17 the coastal portion of the park offers a shallow, highly productive habitat for sea birds,
18 fish, and marine mammals. Currents, bathymetry (depth), and substrate determine the
19 distribution of marine communities in the subtidal zone. These factors in turn affect more
20 inland habitats, such as the intertidal zone, bays, and estuaries, to varying degrees.
21 Though much of this discussion focuses on coastal subtidal areas, it should be noted that
22 estuarine areas also include subtidal areas. Subtidal habitats are particularly threatened in
23 San Francisco Bay and the surrounding coastline due to intense coastal development and
24 expansion of marine transportation systems. Dredging for port modernization, sand
25 mining, and alteration of rocky reef habitats near navigation channels can severely impact
26 subtidal habitats and affect **trust resources** (NPS 2007a).

27 **Continental Shelf and Slope.** The continental slope, which is still considered part of the
28 continent, together with the continental shelf, is called the continental margin. Golden
29 Gate National Recreation Area waters extend to Gulf of Farallones National Marine
30 Sanctuary, which covers both the continental shelf and slope. From the shoreline to a
31 depth of about 328 to 492 feet (100 to 150 meters), the shelf is nearly horizontal, with
32 rocky outcrops, gravel, sand, clay, silt, and deposits of broken shells covering it. About
33 25 miles (40 km) from the coast, the seafloor drops off, creating the continental slope
34 with a grade of about 3 degrees. The slope extends to about 2 miles deep (3,200 meters)
35 and is covered with uniform sandy sediment (NMS, NOAA 2006).

36 **Estuarine Resources.** Approximately 59 miles of ocean and bay coastline are included
37 in Golden Gate National Recreation Area (NPS 2007a). Coastal and bay resources
38 compromise biologically diverse and complex ecosystems, which contain a rich array of
39 marine invertebrates and algae. Intertidal communities within or adjacent to the
40 boundaries include islands, islets, reefs, rocks, straits, lagoons, mudflats, beaches, piers,
41 wharves, the Gulf of Farallones, and the San Francisco Bay Estuary (NPS 1999b).

42 Golden Gate National Recreation Area estuaries, bays, and lagoons have endured
43 considerable physical disturbance and pollution due to their proximity to the highly
44 urbanized City of San Francisco. Some areas were heavily modified in past eras, causing
45 major changes in habitat structure, including Big Lagoon at Redwood Creek,

1 Horseshoe Bay, and Crissy Field. Restoration is either planned or already accomplished
2 in these areas. In the recent past, the San Francisco Peninsula experienced significant
3 bacterial pollution from storm water runoff; however, treatment since the 1990s has
4 significantly reduced pollution levels. High levels of PCBs, PAHs and heavy metals are
5 still major issues facing San Francisco Bay coastal waters, and continued restoration is
6 likely to improve local water quality conditions in some areas like the nearshore Presidio
7 (NPS 2007a).

8 While active restoration efforts are reclaiming wetlands, some embayments are accreting
9 too much sediment. Though sedimentation is a natural process, Tomales Bay, Drakes
10 Bay, and Bolinas Lagoon appear to be experiencing higher than normal sedimentation
11 rates. The evaluation of these complex tidal system dynamics and the possible impacts
12 due to climate change will depend on accurate habitat mapping procedures. Currently,
13 there is significant emphasis in Point Reyes National Seashore and Golden Gate National
14 Recreation Area on mapping wetland extent and quality; however, these efforts are not
15 yet completed and historical information on wetland habitats is limited. Where efforts are
16 being made to restore tidal marsh habitat, such as at Redwood Creek and the Giacomini
17 Ranch, our understanding of these systems is improving (NPS 2007a).

18

19 **BIOLOGICAL RESOURCES**

20 **Habitat (Vegetation and Wildlife)**

21 ***Marine and Estuarine***

22 ***Intertidal Zone***

23 The intertidal habitat (the area between high tide and low tide lines) is biologically rich,
24 supporting diverse assemblages of organisms. It is characterized by extreme conditions
25 caused by wind, waves, and the fluctuation of tides. The animals inhabiting intertidal
26 zones are subject to periodic immersion in water, followed by exposure to air. They must
27 withstand varying degrees of wave shock, dramatic temperature changes, changes in
28 moisture, attacks from both marine and terrestrial predators, and human-caused effects,
29 such as trampling and collecting (NMS, NOAA 2006).

30 Four zones of rocky intertidal organisms are traditionally associated with different tidal
31 heights. Species distributions are restricted according to physiological tolerance along the
32 thermal and moisture gradient in the intertidal zone. The splash zone is almost always
33 exposed to air, and has relatively few species. The high intertidal zone is exposed to air
34 for long periods twice a day. The mid-intertidal zone is exposed to air briefly once or
35 twice a day, and the low intertidal zone is exposed only during the lowest tides (NMS,
36 NOAA 2006).

37 On unconsolidated muddy or sandy shores, algae are rare; benthic diatoms are the only
38 marine algae that may be present. On sandy beaches, much of the invertebrate life—such
39 as worms, crustaceans, snails, and clams—dwell under unconsolidated substrate.

40 Common crustaceans and mollusks include the beach hopper (*Megalorchestia*
41 *californiana*), spiny mole crab (*Blepharipoda occidentalis*), and sand crab (*Emerita*
42 *analoga*). Common marine worms include *Anatides groenlandica*, *Eteone dilate*, and
43 *Euzonus* spp. (NMS, NOAA 2006).

1 Rocky shores support a richer assortment of plants and animals. Algae include numerous
 2 species of green, brown, and red algae, as well as beds of surfgrass. A wide variety of
 3 invertebrates, including anemones, barnacles, limpets, and mussels, compete for space
 4 with the algae in the intertidal zone. Mobile invertebrates, such as sea stars, snails, and
 5 crabs, often hide in crevices or under rocks, emerging to graze on algae or prey on other
 6 animals. Small fishes may also live in the small pools of water that fill up with each tidal
 7 cycle. Typical intertidal invertebrate species of central and northern California include
 8 lined shore crab (*Pachygrapsus crassipes*), purple shore crab (*Hemigrapsus nudus*),
 9 isopods (*Idotea* spp.), California mussels (*Mytilus californianus*), periwinkles (*Littorina*
 10 spp.), lemon nudibranch (*Anisodoris nobilis*), troglodyte chiton (*Nuttallina californica*),
 11 bat star (*Asterina miniata*), black turbin snail (*Teynla funebris*), the giant green
 12 anemone (*Anthopleura xanthogrammica*), aggregating anemone (*Anthopleura*
 13 *elegantissima*), and other species of bryozoans, nudibranchs, sponges and tunicates.
 14 Intertidal fishes, such as the crevice kelpfish (*Gibbonsia montereyensis*) and the tide pool
 15 sculpin (*Oligocottus maculosus*), are limited to tide pools or to passing through the
 16 intertidal zone at high tide (NMS, NOAA 2006).

17 Birds forage in the intertidal zone at low tide or roost in the cliffs just above the shore.
 18 There are a great many species of shorebirds along the beaches, including sanderlings
 19 (*Calidris alba*), short-billed dowitchers (*Limnodromus griseus*), western gulls (*Larus*
 20 *occidentalis*), glaucous-winged gulls (*Larus glaucescens*), and California gulls (*Larus*
 21 *californicus*). Shorebirds, such as sanderlings and dowitchers, routinely forage in the
 22 receding surf, an indication that there are sand-dwelling crustaceans available. Another
 23 bird found in this area is the snowy plover (*Charadrius alexandrinus nivosus*), whose
 24 threatened status has resulted in some significant resource management actions in central
 25 California, including restrictions on access or types of use in some shoreline areas. In
 26 addition to the snowy plover, typical shorebird breeders in this habitat include the black
 27 oystercatcher (*Haematopus bachmani*), killdeer (*Charadrius vociferus*), sanderlings,
 28 willets (*Catoptrophorus semipalmatus*), and marbled godwits (*Limosa fedoa*). Brown
 29 pelicans (*Pelecanus occidentalis*), surf scoters (*Melanitta perspicillata*), grebes (family
 30 *Podicipedidae*), cormorants (*Phalacrocorax* spp.), and many other seabird species can be
 31 found in water beyond the breaking waves or flying through the area. Caspian terns
 32 (*Sterna caspia*), Forster terns (*Sterna forsteri*), and whimbrels (*Numenius phaeopus*) are
 33 some of the summer migrants that forage along the coastal beaches. Winter migrants
 34 include loons (*Gavia* spp.), willets, black-bellied plovers (*Pluvialis squatarola*), godwits
 35 (*Limosa* spp.), and turnstones (*Arenaria melanocephala*) (NMS, NOAA 2006).

36 Marine mammals are also found in this habitat. Pacific harbor seals (*Phoca vitulina*), and
 37 California sea lions (*Zalophus californianus*) are frequently seen seaward of the surf
 38 zone; sea otters (*Enhydra lutris*) and Steller sea lions (*Eumetopias jubatus*) are occasional
 39 visitors. Seals and sea lions haul out on intertidal shores for warming and breeding
 40 (NMS, NOAA 2006).

41 At Alcatraz Island, the rocky intertidal community on the Alcatraz reef is characterized
 42 by attached flora and fauna such as rockweed (*Fucus gairdneri*), turfweed (*Endocladia*
 43 *muricata*), and barnacles. Areas with crevices or overhangs are often harboring mobile
 44 species such as shore crabs and seastars.

45

1 ***Subtidal and Nearshore Waters***

2 Subtidal habitats (shallow water areas below mean low water) and nearshore waters
3 (shallow inshore waters of the continental shelf) support many different species. Krill
4 (*euphausiids*) is a crucial or “keystone” species in the area. They are small, shrimp-like
5 crustaceans that congregate in large dense masses called swarms or clouds. Two krill
6 species form the primary forage for upper tropic levels in the adjacent sanctuary. Krill
7 feed on phytoplankton and are very important in the food web since many other species
8 feed on krill. Krill form a key trophic link in coastal upwelling systems between primary
9 production and higher trophic level consumers. Most marine predators subsist at least
10 part of the year on krill, which is the primary prey of seven of the ten most important
11 commercial fishes on the central California coast. Krill are also very important food
12 sources for baleen whales and seabirds (NMS, NOAA 2006).

13 The nutrient-rich sanctuary waters near Golden Gate National Recreation Area provide
14 forage for the largest concentration of breeding seabirds in the continental United States.
15 More than 120 species of birds use these three sanctuaries for shelter, food, or as a
16 migration corridor. Of these, over 40 species are known to use the sanctuary during their
17 breeding season (NMS, NOAA 2006).

18 These same productive waters also support a variety of marine mammals, including gray
19 whales (*Eschrichtius robustus*), humpback whales (*Megaptera novaeangliae*), blue
20 whales (*Balaenoptera musculus*), Dall’s porpoise (*Phocoenoides dalli*), harbor porpoise
21 (*Phocoena sinus*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), northern
22 right whale dolphins (*Lissodelphis borealis*), Risso’s dolphins (*Grampus griseus*) and
23 killer whales (*Orcinus orca*). Some species, such as the gray whale, are only seasonal
24 migrants; others, such as the blue, humpback, and killer whale, travel to the area to feed.
25 Other marine mammals, such as harbor seals and sea lions, can be found in these areas
26 year round (NMS, NOAA 2006).

27 Six species of pinnipeds, some of which are federal listed, are found in the waters
28 offshore of the park. Pinnipeds spend a large amount of time in offshore waters or on
29 offshore islands, but some of the rookeries (breeding places or breeding colonies usually
30 crowded with the same species) and haul-out areas occur in this habitat. Species found in
31 the area are California sea lion, Pacific harbor seal, Steller sea lion, northern elephant seal
32 (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), and on occasion, the
33 Guadalupe fur seal (*Arctocephalus townsendi*). The various species have numerous seal
34 rookeries or colonies and are found at different times of the year, feeding on the abundant
35 fish and invertebrate resources of the island shelves or hauling out on rocks and beaches
36 (NMS, NOAA 2006).

37 A variety of fish species occur within these habitats, including rockfishes, cabezon,
38 surfperch (family *Embiotocidae*), wrasses (family *Labridae*) and seniorita (*Oxyjulus*
39 *californica*). Commercially harvested species include salmon, tuna, crab, squid, and
40 various rockfish. Both the salmon and crab fisheries are the most important fisheries in
41 the sanctuaries. The West Coast Dungeness crab fishery is considered the most
42 sustainable large-scale commercial crab fishery in the world. Both chinook and coho
43 salmon are coastal migrants. (NMS, NOAA 2006).

1 Kelp forests support a variety of species, including sea otters and sea urchins. Other
2 marine mammals, such as harbor seals and California sea lions, are common in and
3 around kelp forests, as are a variety of fishes, such as the señorita (*Oxyjulus californica*),
4 the kelp surfperch (*Brachyistius frenatus*), blue rockfish (*Sebastes mystinus*), blacksmith
5 (*Chromis punctipinnis*), and olive rockfish (*S. serranoides*). The kelp canopy, stipes, and
6 holdfasts increase the available habitat for nearshore species and offer protection to
7 juvenile finfish. Bat star (*Asterina miniata*), sea lemon (*Anisidoris nobilis*), barnacles
8 (*Balanus spp.*), red volcano sponge (*Acarinus erithacus*), and urchin are a few of the
9 many types of invertebrates that inhabit the kelp forest and rocky subtidal habitats (NMS,
10 NOAA 2006).

11 Golden Gate National Recreation Area contains areas of sandy beaches, some barely
12 accessible narrow strips along the shoreline while others are large expanses readily
13 accessed and heavily used. Beach wrack—a thick tangle of kelp and sea grass that
14 washes ashore during high tides—supports an intricate food web and community. Until
15 recently, beach wrack was removed from many park beaches; now this practice has been
16 discontinued. Recreational activities on park beaches, unleashed dogs, and kayaks impact
17 both shorebird and pinniped populations. Efforts to minimize disturbance during the past
18 5 to 10 years appear to have met with some success and certain species such as snowy
19 plover and harbor seal populations seem stable after years of decline (NPS 2007a).

20 Although local data are not comprehensive, notable trends and observations for key
21 indicators in California nearshore marine and estuarine habitats likely to occur in the
22 parks include the following:

- 23 • decline in populations of all California abalone
- 24 • northern spread of the rickettsial-like bacteria responsible for withering syndrome
25 in black abalone which was recently observed just south of Golden Gate National
26 Recreation Area.
- 27 • decline in rockfish species such as bocaccio (*Sebastes paucispinus*)
- 28 • decline in the extent of kelp forests caused by pollution, wave damage due to
29 storms, and El Niño warming
- 30 • stable Dungeness crab populations as a result of successful fisheries management
- 31 • increase in dune- and beach-dependent snowy plovers after significant declines
32 observed in the mid 1990s resulted in protective management
- 33 • stable population levels of harbor and elephant seals
- 34 • decline in pelagic sea birds due to climate regime shifts and human disturbance
35 including bycatch, nest disturbance, and oil spills
- 36 • increase in tidal marsh lands due to restoration activities and protective measures
37 (NPS 2007a)

38

1 ***Estuarine and Lagoon***

2 Estuaries and lagoons serve as important habitats for many fishes, birds, and mammals.
3 They provide suitable habitat for reproduction, feeding, resting, and cover. Estuaries and
4 lagoons support unique biological communities with both aquatic and terrestrial
5 characteristics. Halophytic vegetation, such as pickleweed (*Allenrolfea occidentalis*),
6 grows higher in the marsh where flooding occurs less frequently and salt may become
7 concentrated. However, little vegetation can grow in areas characterized by high
8 evaporation and high soil salinity. A diverse assemblage of wetland plants grows in areas
9 near tidal creeks where fresh water input is high. As the plant matter breaks down into
10 detritus, it is consumed by various filter feeders, deposit feeders, and other omnivores and
11 scavengers. These species, in turn, provide abundant food resources for other species of
12 fish, birds, and mammals. Brackish water supports a distinctive assemblage of
13 invertebrate and fish species, including the endangered tidewater goby (*Eucyclogobius*
14 *newberryi*), delta smelt (*Hypomesus transpacificus*), and the stickleback (*Gasterosteus*
15 *aculeatus leiurus*). Other estuarine species can include jacksmelt (*Atherinopsis*
16 *californiensis*), Pacific sardine (*Sardinops sagax caerulea*), Pacific herring (*Clupea*
17 *pallasii*), staghorn sculpins (*Leptocottus armatus*), several rockfishes, salmonids, clupeids
18 (*Clupeleonella* ssp.), and embiotocids (*Embiotocidae*) (NMS, NOAA 2006).

19 The estuaries and bays of coastal California are part of the Pacific Flyway, one of the
20 four principal bird migration routes in North America. San Francisco Bay supports a
21 large number of migratory and resident birds. Also important for birds are Tomales Bay,
22 Bollinas Lagoon, Pescadero Marsh, and Elkhorn Slough. Bollinas Lagoon and Tomales
23 Bay are designated wetlands of significant international importance under the Convention
24 on Wetlands. Marine mammals, including harbor seal, harbor porpoise, and sea otter,
25 occur in these bays (NMS, NOAA 2006).

26 Seagrass beds, which occur in the bays and lagoons, are highly productive habitats that
27 support a unique assemblage of invertebrates and fishes. Many fishes, including Pacific
28 herring, spawn in seagrass beds among other habitats. The structure of seagrass beds
29 provides protection from predation for juvenile invertebrates and fishes. Large numbers
30 of shorebirds and waterfowl are attracted to seagrass beds, where they feed on the
31 seagrass, fishes, and invertebrate eggs and young (NMS, NOAA 2006).

32 The marine environment around Slide Ranch includes exposed outer coastlands with a
33 rich display of sponges, hydroids, bryozoans, and tunicates. Muir Beach is also home to a
34 variety of submarine sponges, hydroids, bryozoans, and tunicates. Tennessee Cove
35 contains unique geological features including the only California central coast display of
36 highly polished shells of *Collisella digitalis*. Sea caves contain unusually large isopod
37 (*Ligia occidentalis*) specimens. Kirby Cove contains giant isopods of unusually large size
38 and high densities of starfish (*Pisaster ochraceous* and *Patria miniata*). Bird Island, with
39 its guano-covered sea stack, produces abnormally sized marine invertebrates and plants,
40 including large California mussels and surfgrass, marine kelp and giant kelp, sea
41 anemones and purple seastar, as well as high densities of chilipepper shrimp (*Tigriopus*
42 *californica*). The underwater marine life is abundant and includes high densities of
43 sponges, hydroids, bryozoans, and tunicates. The Alcatraz intertidal zone ranks high in its
44 abundance and diversity of marine algae (NPS 1999b).

1 Estuaries, bays, and lagoons provide rich habitats including subtidal seagrasses, tidal
2 mudflats, and marshes that support a rich diversity of wildlife. Historical construction of
3 levies and seawalls disrupted tidal regimes and dramatically reduced the extent of tidal
4 marsh coverage in both parks. Inherently lower rates of hydrologic mixing in estuaries
5 and especially in lagoons, enhances their vulnerability to pollution and invasive species
6 (NPS 2007a).

7 Though not as well studied as in San Francisco Bay, invasive species are established in
8 estuaries and lagoons in northern coastal areas of the park, but at much lower levels than
9 in San Francisco Bay. Despite these threats, Tomales Bay and Drakes Estero are
10 considered relatively pristine and support variable but healthy biological communities.
11 Wetland restoration projects, such as the 563-acre Giacomini Ranch Restoration Project,
12 will further enhance resource condition (NPS 2007a).

13 Due to its favorable currents and nearshore foraging areas, the waters around Alcatraz
14 Island provide rich sources of food for the colonial waterbirds that nest on the island
15 (NPS 2001). These waters are subject to the same influences as the rest of San Francisco
16 Bay.

17 ***Benthic Communities***

18 The benthic community is made up of organisms that live in and on the bottom of the
19 ocean floor. Benthic species include worms, clams, crabs, lobsters, sponges, and other
20 tiny organisms that live in the bottom sediments. Benthic species are divided into the
21 filter feeders and the deposit feeders. Filter feeders filter their food by siphoning particles
22 out of the water.

23 Various benthic habitats and substrates are found within the waters off Golden Gate
24 National Recreation Area. In addition, benthic communities occur in a variety of the
25 habitats described in this section, including subtidal rocky reefs, kelp forests, soft bottom
26 habitats, and deep ocean floor habitats. The continental shelf descends gradually from the
27 coast to the shelf break. Benthic communities along the continental shelf are covered in
28 part by a layer of mud. Outcropping bedrock and sand cover the continental shelf at
29 depths greater than 295 feet (90 meters). Benthic organisms play a critical role and make
30 up a diverse group that are a major link in the food chain (NMS, NOAA 2006).

31 The south side of Alcatraz Island contains a sheer rock wall that terminates on a narrow
32 rock reef about 10-15 m wide. This narrow intertidal reef extends only for a short
33 distance (about 200 m) but represents one of the few rocky reefs within the San Francisco
34 Bay. Other rocky intertidal portions of the island are comprised of riprap and rubble
35 similar to the shorelines of much of the Bay. The rocky intertidal community on the
36 Alcatraz Island reef is characterized by attached flora and fauna such as rockweed (*Fucus*
37 *gairdneri*), turfweed (*Endocladia muricata*), and barnacles. Areas with crevices and
38 overhangs are often harboring mobile species such as shore crabs and seastars.

39 ***Terrestrial/Freshwater***

40 ***Plant Communities***

41 The vegetation of Golden Gate National Recreation Area is a result of the juxtaposition
42 of physical landforms and water masses, and associated geology, climate, and history.
43 The moist maritime climate along the coastline is a dominant influence, while the park's

1 east-facing sites are subject to drier inland conditions. Distinct changes in soils from the
2 rich conditions of the Franciscan melange to the unique chemistry of serpentinitic
3 outcrops have created a diverse mosaic of vegetation communities. Natural processes,
4 including landslides, rainfall patterns, and fires, affect these patterns and add another
5 layer of complexity to the system. Golden Gate National Recreation Area is known to
6 support 572 native and 336 nonnative terrestrial plant species, including 25 federal-listed
7 threatened and endangered plant and wildlife species (NPS 2005a).

8 Alcatraz Island generally consists of grassland, shrubs, historic gardens, nonnative trees,
9 and cliffs and other barren areas, along with buildings and other paved areas. The
10 landscape vegetation consists of a diverse group of nonnative ornamental shrubs and
11 trees, which provide the vegetative structure and habitat for wildlife on the island (NPS
12 2001).

13 **Coastal Scrub and Chaparral.** The coastal scrub community is dominated by coyote
14 brush (*Baccharis pilularis*), California sagebrush (*Artemisia californica*), bush lupine
15 (*Lupinus arboreus*), and poison oak (*Toxicodendron diversilobum*), with variations in
16 dominant species based on moisture levels, soil types and slopes, and past land use
17 history (Howell 1970). This community intergrades and creates a mosaic with the
18 grassland community, and is found throughout the park from near sea level to 2,500 feet.
19 The coastal scrub community also contains large numbers of nonnative species, and at
20 times is dominated by nonnative shrubs such as French broom (*Genista monspessulana*)
21 and thoroughwort (*Ageratina adenophora*). Chaparral stands exist within the park, but are
22 not all that abundant. Small communities of chaparral exist in Muir Woods National
23 Monument and the Marin Headlands, as well as larger areas on Bolinas Ridge. There are
24 several types of chaparral in the park, including chamise chaparral, ceanothus chaparral,
25 and manzanita chaparral (NPS 2005a).

26 **Grasslands.** The grassland community at Golden Gate National Recreation Area extends
27 from sea level to nearly 2,600 feet. It forms a mosaic with the coastal scrub community
28 and mixed evergreen forests. The coastal prairie areas appear to have evolved under light
29 seasonal grazing pressure with occasional fire (NPS 2005a).

30 Pristine grassland was thought to have been composed of evenly spaced bunchgrasses
31 with annual forbs occupying areas between tussocks. It has been shown that purple
32 needlegrass (*Nasella pulchra*)—the California state grass—was a major dominant of that
33 grassland type along with other perennial grasses. The lack of continuous fuels and
34 compactness of the grasses themselves would have resulted in fires of moderate intensity
35 with low to moderate rates of spread. These grasslands have had the greatest disturbance
36 of any natural habitat in this area. Four main factors have contributed to this disturbance:
37 (1) an increase in grazing pressures, (2) the introduction of highly competitive nonnative
38 plants, (3) cultivation, and (4) the elimination of fire (NPS 2005a).

39 Today, the grasslands are dominated by nonnative annual grasses and forbs adapted to
40 Mediterranean conditions. These dense stands of annual grasses burn with greater
41 intensity and more rapid rates of spread than native grasses. Additionally, annual species
42 cure rapidly with the onset of summer drought, resulting in a longer fire season (NPS
43 2005a).

44

1 **Figure 7: Vegetation Communities Map**

2

3 **[Insert Vegetation Communities Map here]**

4

5

6

7

8

9

10

PART 8: THE AFFECTED ENVIRONMENT

- 1
- 2
- 3
- 4 Back of map
- 5

1 The exclusion of grazing, extirpation of large native mammals, and suppression of
 2 wildfires have caused a marked increase in acreage covered by coyote bush (*Baccharus*
 3 *pilularis*) and the resulting coastal scrub community in the Bay Area. It should be noted
 4 that grassland and coastal scrub communities are a dynamic mosaic with changes in
 5 dominance over time, and in some areas these two communities are in equilibrium with
 6 no invasion occurring (NPS 2005a).

7 **Riparian Forest and Scrub.** These streamside forests and shrub lands are dominated by
 8 broad-leaved deciduous trees or shrubs, most commonly willows (*Salix lasiolepis* or *S.*
 9 *lucida* ssp. *lasiandra*) and occasionally red alder (*Alnus rubra*). The understory is
 10 typically dense, with a variety of shrubs including native berries—native salmonberry
 11 (*Rubus spectabilis*), thimbleberry (*R. parviflorus*), and California blackberry (*R*
 12 *ursinus*)—as well as nonnative Himalayan blackberry and Cape-ivy. Numerous
 13 herbaceous species, including ferns, rushes, and sedges, dominate the shrub understory.
 14 Nonnative trees, including eucalypts (*Eucalyptus* spp.) and Monterey cypress (*Cupresslls*
 15 *macrocarpa*), have become successfully established within the riparian forest strands in
 16 the park (NPS 2005a).

17 **Native Hardwood Forest.** This variable community extends from 200 to 2,500 feet in
 18 elevation, and is dominated by oak (*Quercus* spp.), California bay laurel (*Umbellularia*
 19 *californica*), and tanoak (*Lithocarpus densiflorus*). Along the mesic boundary of this
 20 plant community is the mixed evergreen forest of the redwood-Douglas-fir community;
 21 along the xeric boundary is the coastal scrub and grasslands.

22 Coast live oak (*Quercus agrifolia*) dominates the native hardwood forest at elevations
 23 below 1,000 feet. It is often the only species present on hills frequented by a cool, foggy,
 24 coastal climate. Interior live oak (*Q. wislizenii*) sometimes replaces coastal live oak in
 25 canyon bottoms and north-facing slopes. As the community approaches 1,000 feet in
 26 elevation, California bay (*Umbellularia californica*), tanoak (*Lithocarpus densiflorus*),
 27 and other hardwoods become common (NPS 2005a).

28 **Douglas-fir and Coast Redwood.** The majestic old-growth redwood forest at Muir
 29 Woods National Monument, with Redwood Creek peacefully flowing through groves of
 30 tall trees, attracts much visitor attention. This tranquil scene is a rare sight close to a large
 31 metropolitan area. Many species contribute to this ecosystem. Major overstory and
 32 understory trees include coast redwood (*Sequoia sempervirens*), Douglas-fir
 33 (*Pseudotsuga menziesii*), California bay laurel (*Umbellularia californica*), tanoak
 34 (*Lithocarpus densiflorus*), California hazel (*Corylus californica*), and madrone (*Arbutus*
 35 *menziesii*) (NPS 2005a). Douglas-fir communities are found on Bolinas Ridge and within
 36 Muir Woods National Monument. The communities on Bolinas Ridge have been
 37 previously logged.

38 **Nonnative Evergreen Forest.** Many nonnative tree species have become established in
 39 Golden Gate National Recreation Area through both intentional and unintentional
 40 introductions, including ornamental plantings, plantings for windbreaks or shade for
 41 pastures, and escapes from cultivated and developed areas. Many of these trees—
 42 including a number of eucalypts (*Eucalyptus* spp.), acacia (*Acacia* spp.), Monterey pine
 43 (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*)—have invaded native
 44 communities. Most are very flammable, or significantly change the fire potential in areas

1 that otherwise would support low-intensity or minimal fires, such as the coastal scrub and
2 grassland areas of the park. S(NPS 2005a).

3 **Plant Communities of Alcatraz Island.** Before occupation by Europeans, Alcatraz
4 Island was sparsely vegetated. Trees and shrubs were planted as part of military fort and
5 penitentiary life on the island. Soils brought from the mainland and surrounding islands
6 in the bay contained seeds of native plants, including coyote brush (*Baccharis pilularis*),
7 California poppy (*Eschscholzia californica*) and California blackberry (*Rubus ursinus*),
8 which have become established on the island. Only about 5% of the island is native
9 coastal prairie or coastal scrub community, the rest is dominated by nonnative species
10 (NPS 2001).

11 The landscape vegetation is nonnative, but it provides significant shelter and habitat on the
12 island. Shrubs are common and include rose, mirrorbush, fig, blackberry, agave,
13 Australian tea ivy, mimosa, coyote brush, plume acacia, and Monterey cypress. A small
14 stand of native grassland dominated by creeping wildrye (*Leymus triticoides*) is located
15 on the Northeast Perimeter Trail near the Power House complex. Another smaller stand is
16 present in the Cistern area. Ruderal vegetation occurs along the edges of walkways,
17 buildings, and building remains. Dominant species in these areas are wild oats, wild
18 radish, mustard, and cheeseweed. Rocky cliffs and bluffs are found primarily along the
19 island perimeter. The southwestern cliffs support various succulents, agave, sourgrass,
20 sweet asylum, wild radish, and large shrubs in areas where Brandt's cormorants, western
21 gulls, and pigeon guillemots nest. These plants provide nesting material and protection
22 for the birds (NPS 2001).

23 **Wetlands.** Herbaceous wetlands are known as emergent wetlands in the Cowardin
24 wetlands classification. They consist of a mix of low-growing species of sedges (*Carex*
25 spp.), rushes (*Juncus* spp.), and other wetland-dependent species (*Scirpus microcarpus*,
26 *Typha* spp. *Cyperus eragrostis*, *Equisetum* spp.), as well as some nonnative species of
27 grasses and forbs. The grasses include velvet grass (*Holcus lanatus*) and harding grass
28 (*Phalaris aquatica*) and the forbs include Cape-ivy (*Delaria odorata*) and Vinca (*Vinca*
29 *major* and *V. minor*). Also included are areas covered with various reeds along the shores
30 of lagoons and ponds, herbaceous strips of vegetation along perennial and ephemeral
31 stream courses, and isolated wetland patches where seeps spring from the hill slopes.
32 Some special status plant species—locally to regionally rare—occur within this
33 community (NPS 2005a).

34 Golden Gate National Recreation Area has abundant wetland resources, including wet
35 meadows, seeps, streams, riparian forests, lakes, ponds, and lagoons. Wetlands, according
36 to the definition developed by the U.S. Fish and Wildlife Service and adopted by the
37 National Park Service, are lands transitional between terrestrial and aquatic systems,
38 where the water table is usually at or near the surface or the land is covered by shallow
39 water. Wetlands generally include marshes, riparian zones, mudflats, rocky intertidal
40 zones, and gravel beaches. Deepwater habitats such as rivers, lakes, and estuaries are not
41 technically wetlands but are classified as aquatic sites using the same classification
42 system. Wetland ecosystems act to buffer hydrologic and erosional cycles, control and
43 regulate cycles of nitrogen and other key nutrients, and create valuable habitat for animal
44 species.

1 The wetlands in Golden Gate National Recreation Area have been field-mapped in
2 several watersheds, including the Rodeo Creek watershed, the Presidio of San Francisco,
3 and portions of the Redwood Creek and Bolinas Lagoon watersheds. The remainder of
4 the park has not been field-mapped but contains areas of wetland vegetation that can be
5 extracted from the parkwide vegetation mapping results. The majority of wetlands in
6 Golden Gate National Recreation Area are located in the valley bottoms, with seeps and
7 small intermittent streams reaching into the higher portions of the watersheds (NPS
8 2005a).

9 **Wildlife**

10 The entire park is included within the Central California Coast International Biosphere
11 Region. The park's diverse habitats support a rich assemblage of wildlife. At least 387
12 vertebrate species are known to occur within the park boundaries. Species lists compiled
13 from a variety of sources and incomplete inventories include 11 amphibians, 20 reptiles,
14 53 fish, 53 mammals, and 250 birds. Terrestrial invertebrates in the park are less well
15 known; however, two areas of the park, Marin Headlands and Milagra Ridge, support
16 diverse butterfly populations. Wildlife habitats within the park include introduced
17 eucalyptus and closed-cone Monterey pine and cypress forests; hardwood, mixed
18 evergreen, Douglas-fir, redwood, and riparian forests; coastal scrub; annual and perennial
19 grasslands; freshwater and saline wetlands and wet meadows; and estuarine, lacustrine,
20 marine, and riverine aquatic habitats (NPS 2005a).

21 Alcatraz Island is a valuable natural habitat for colonial waterbirds due to favorable
22 currents and nearshore foraging areas. The island supports a diverse assembly of marine
23 and estuarine colonial nesting birds. Species of particular interest are black-crowned
24 night herons, pigeon guillemots, Brandt's and pelagic cormorants, and western gulls.
25 (NPS 2001)

26 **Mammals.** Terrestrial habitats within the planning area support a diversity of mammals.
27 Meso-carnivores, including the gray fox (*Urocyon cinereoargenteus*), bobcat (*Felis*
28 *rufus*), and the recently reestablished coyote (*Canis latrans*), inhabit coastal scrub and
29 grasslands. Mountain lions (*Felis concolor*) have been sighted in some undeveloped areas
30 of the park. These carnivores feed on a variety of small and large mammals such as the
31 Pacific black-tailed deer (*Odocoileus hemionus columbianus*), broad-footed mole
32 (*Scapanus larimanus*), pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus*
33 *maniculatus*), western harvest mouse (*Reithrodontomus megalotis*), California vole
34 (*Microtus californicus*), and brush rabbit (*Sylvilagus bachmani*). Badgers (*Taxidea taxus*)
35 are also infrequently encountered. Some species, such as the western harvest mouse,
36 appear to be restricted to areas where native perennial grasses persist. (NPS 2005a)

37 In addition to many of the mammals listed above, Muir Woods National Monument and
38 other forested areas within the planning area support vagrant shrew (*Sorex vagrans*),
39 Trowbridge's shrew (*Sorex trowbridgii*), Sonoma chipmunk (*Tamias sonomae*), western
40 gray squirrel (*Sciurus griseus*), opossum (*Didelphis virginiana*), and dusky-footed
41 woodrats (*Neotoma fuscipes*). Other mammalian carnivores include the raccoon (*Procyon*
42 *lotor*), striped skunk (*Mephitis mephitis*) and spotted skunk (*Spilogale gracilis*), long-
43 tailed weasel (*Mustela frenata*), and the recently returned river otter (*Lontra Canadensis*).
44 (NPS 2005a)

1 Seventeen species of bats have been detected within the park. Ten species of bats have
2 been documented in Muir Woods National Monument , including four federal or state
3 species of concern: Townsend's western big-eared bat (*Corynorhinus townsendii*
4 *townsendii*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*),
5 and Yuma myotis (*Myotis yumanensis*). Many of the bats have been observed using
6 redwood fire-scar cavities for roosting. At the Marin Headlands, several historic World
7 War II structures were found to be occupied by the Townsend's western big-eared bat and
8 the Yuma myotis, both federal species of concern. The Brazilian free-tailed bat (*Tadarida*
9 *brasiliensis*) forages over coastal scrub habitat within the Marin Headlands (NPS 2005a).

10 Isolated coastal rocks, beaches, and lagoon sand flats in the park serve as haul-outs for
11 harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Up to
12 250 harbor seals haul out in Point Bonita Cove along the slopes of the Marin Headlands.
13 As the northern elephant seal (*Mirounga angustirostris*) population rapidly increases, the
14 seals are encountered more frequently on sandy beaches throughout the region. California
15 gray whales (*Eschrichtius robustus*), humpback whales (*Megaptera novaeagliae*), and
16 harbor porpoises (*Phocoena phocoena*) use offshore waters; young whales occasionally
17 wander into San Francisco Bay. Southern sea otters (*Enhydra lutris nereis*) are
18 infrequently seen offshore with numbers increasing as the population spreads north (NPS
19 2005a).

20 Alcatraz Island is home to deer mice and several bat species. Small numbers of seals and
21 sea lions haul out on the island's rocky areas (NPS 2001).

22 **Birds.** Located along the Pacific Flyway, Golden Gate National Recreation Area
23 provides habitat for a great diversity of breeding, overwintering, and migratory birds.
24 Nineteen species of diurnal raptors have been detected in migration over the ridges of the
25 Marin Headlands. Red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks (*Buteo*
26 *lineatus*), and great homed owls (*Bubo virginianus*) nest in many of the large nonnative
27 eucalyptus trees in the park. A wide range of other raptors and at least ten owl species
28 occur within the planning area. Numerous species of waterbirds also occur within the
29 park in marine and rocky intertidal habitats, cliffs, beaches, and tidal and wetland areas
30 (NPS 2005a).

31 Point Reyes Bird Observatory (now PRBO Conservation Science) encountered 83 bird
32 species during 1997 breeding landbird censuses in coastal grassland, coastal scrub,
33 riparian, and mixed hardwood habitats. From point count censuses in 1999 and 2000,
34 white-crowned sparrows (*Zonotrichia leucophrys*), red-winged blackbirds (*Agelaius*
35 *phoeniceus*), savannah sparrows (*Passerculus sandwichensis*), and song sparrows
36 (*Melospiza melodia*) were the most commonly detected species in grasslands. The most
37 abundant species in coastal scrub were white-crowned sparrows, spotted towhees (*Pipilo*
38 *maculatus*), and wrentits (*Chamaea fasciata*). In forested habitats, bushtits (*Psaltiriparus*
39 *minimus*), chestnut-backed chickadees (*Poecile rufescens*), dark eyed juncos (*Junco*
40 *hyemalis*), Pacific-slope flycatchers (*Empidonax difficilis*), and winter wrens (*Troglodytes*
41 *troglodytes*) were commonly detected. Based on songbird nest monitoring in riparian
42 habitats along Redwood and Lagunitas creeks, the song sparrow, Swainson's thrush
43 (*Catharus ustulatus*), warbling vireo (*Vireo gilvus*), and Wilson's warbler (*Wilsonia*
44 *pusilla*) were the most commonly observed nesters. The brown-headed cowbird
45 (*Molothrus ater*) is a nest parasite that negatively affects the reproductive success of

1 open-cup nesting songbirds and occurs throughout the planning area. Many of the
2 landbirds in the planning area are Neotropical migrants, with others identified as species
3 of management concern and riparian species of conservation priority by California
4 Partners in Flight (NPS 2005a).

5 Alcatraz Island is a particularly important site for birds. A number of colonial waterbird
6 species inhabit Alcatraz Island. Waterbird species of interest include Brandt's Cormorants
7 (*Phalacrocorax penicillatus*), Pelagic Cormorants (*P. pelagicus*), Western Gulls (*Larus*
8 *occidentalis*), Pigeon Guillemots (*Cephus columba*), Black Oystercatchers (*Haematopus*
9 *bachmani*), Black-crowned Night Herons (*Nycticorax nycticorax*), Snowy Egrets (*Egretta*
10 *thula*), Great Egrets (*Casmerodius albus*), Great Blue Herons (*Ardea herodias*), and
11 California Gulls (*Larus californicus*). The Brandt's Cormorant colony on Alcatraz Island
12 is one of the few known estuarine breeding sites for this species. Pigeon Guillemots breed
13 nowhere else in the San Francisco Bay, and the Western Gull and Black-crowned Night
14 Heron colonies are among the largest in the Bay (Acosta et al. 2008).

15 This diversity of species exists in a delicate balance with the considerable human
16 presence both on and around Alcatraz Island. Colonial waterbird populations on the
17 island experience substantial disturbance from a number of different sources. A large
18 number of visitors tour the island annually, and associated historic preservation and
19 safety construction projects, public access to breeding areas, gardening activities that are
20 part of a new historic garden restoration program, and special events could disrupt the
21 breeding efforts of Alcatraz Island seabirds. Encroachment near the Alcatraz Island
22 shoreline by large numbers of commercial or recreational boaters (e.g. tour boats, anglers,
23 kayakers), and uncontrolled aircraft overflights (e.g. air tour operators), may have similar
24 effects. In addition, dredging and other projects that disturb and alter the subtidal
25 environment are potentially disruptive to seabird populations, as these activities may
26 remobilize contaminants, increase turbidity, and destroy essential foraging habitat
27 (Acosta et al. 2008).

28 In 1993, Golden Gate National Recreation Area completed a management plan for
29 Alcatraz Island, which included provisions for maintaining breeding populations of
30 colonial waterbirds. This plan emphasized protection of the island's natural resources,
31 while maintaining opportunities for visitor access, special events, and other island uses.
32 The plan called for natural resource monitoring and the development of protocols to
33 determine baseline information for key wildlife populations (Acosta et al. 2008).

34 **Amphibians and Reptiles.** Small populations of the federal-listed threatened California
35 red-legged frog (*Rana aurora draytonii*) occur within the planning area.

36 Within San Mateo County, historic records indicate the presence of the federal-listed
37 endangered San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). More common
38 terrestrial amphibians in the planning area include ensatina (*Ensatina eschscholtzii*) and
39 California slender salamander (*Batrachoseps attenuatus*). Common species spending a
40 substantial amount of time at streams or ponds for breeding or rearing purposes include
41 California newts (*Taricha torosa*), rough-skinned newts (*Taricha granulosa*), Pacific
42 treefrog (*Hyla regilla*), and California giant salamander (*Dicamptodonensatus*). Common
43 reptiles include the Western fence lizard (*Sceloporus occidentalis*), northern alligator

1 lizard (*Gerrhonotus coemleus*), Pacific gopher snake (*Pituophis melanoleucus*), and
2 western terrestrial garter snake (*Thamnophis elegans*) (NPS 2005a).

3 Alcatraz Island has large populations of California slender salamanders, which are small
4 lungless salamanders that do not require water for breeding. The northern end of the
5 island has moist substrate, which supports the salamanders. Neither the eggs nor the
6 salamanders can tolerate salt spray, so they are limited to upland areas of the island (NPS
7 2001).

8 **Fish.** The planning area includes both resident and transitory fish species that occupy
9 marine, estuarine, and freshwater habitats. Common, nearshore resident estuarine and
10 marine fish include Pacific staghorn sculpin (*Leptocottus armatus*), arrow goby
11 (*Clevelandia ios*), and topsmelt (*Atherinops affinis*). The brackish Rodeo Lagoon in the
12 Marin Headlands supports a large population of the federal-listed endangered tidewater
13 goby (*Eucyclogobius newberryi*) (NPS 2005a).

14 Freshwater streams within the planning area are characterized by naturally low species
15 diversity. Perennial streams may include resident fish such as threespine stickleback
16 (*Gasterosteus aculeatus*) and prickly sculpin (*Cottus asper*). Several important
17 anadromous fish species are present in the creeks and watersheds within the planning
18 area. Anadromous species are those that spawn or breed in streams and rivers and then
19 migrate to and mature in the ocean. Anadromous species that breed and rear in streams
20 within the planning area include coho salmon (*Oncorhynchus kisutch*) and steelhead trout
21 (*Oncorhynchus mykiss*). Both species are listed as threatened under the Endangered
22 Species Act. Intermittent streams or the intermittent headwater streams may support only
23 steelhead trout (NPS 2005a).

24 **Invertebrates.** Two coastal grassland/scrub areas in the park are known for their high
25 numbers and diversity of butterflies: Marin Headlands and Milagra Ridge. The federal-
26 listed endangered mission blue butterfly (*Icaricia icarioides missionensis*) occurs at both
27 sites, while the San Bruno elfin butterfly (*Euphydryas editha bayensis*) is found at
28 Milagra Ridge, where it inhabits rocky outcrops. At least 44 species of butterflies occur
29 in the Marin Headlands and 34 species occur at Milagra Ridge, illustrating the
30 importance of habitat fragments within largely developed landscapes. Various species of
31 skippers, swallowtails, hairstreaks, blues, ladies, admirals, and crescents inhabit these
32 areas. Monarch butterflies (*Danaus plexippus*) are found in clusters overwintering in
33 many areas of the park, often in groves of nonnative trees. Other terrestrial invertebrates
34 have not been well documented (NPS 2005a).

35 Limited information is available regarding the freshwater invertebrates that are present
36 within the planning area. Targeted inventories have been conducted in streams such as
37 Redwood Creek. Two hundred twenty-three freshwater species are known. The only
38 federal-listed species is the endangered California freshwater shrimp, which is found
39 within the Lagunitas Creek watershed, an area managed by Point Reyes National
40 Seashore. Limited information is also available regarding invertebrates from marine and
41 estuarine habitats within the planning area. Two hundred seventy-nine marine and
42 estuarine species are known (NPS 2005a).

43 Alcatraz Island includes a small but significant site used briefly by Monarch butterflies in
44 their fall migration. The butterflies are usually on the Island for 1-5 days during this

1 period and have been reported on vines on the east side of the island and near the chapel
2 (NPS 2001).

3 **Nonnative Wildlife.** Many species of nonnative wildlife have been identified as problem
4 species within the park. These species negatively affect populations of native animals
5 through competition for resources, predation, and as vectors for disease. Nonnative
6 terrestrial mammals include fallow deer (*Cervus dama*), feral hogs (*Sus scrofa*), red fox
7 (*Vulpes vulpes*), opossum (*Didelphis virginiana*), house cats (*Felis domestiells*), and
8 Norway and black rats (*Rattus norvegicus* and *R. rattus*). Nonnative birds found in the
9 planning area include wild turkeys (*Meleagris gallopavo*), European starlings (*Sturnus*
10 *vulgaris*), peasons (*Pavo eristatus*), house sparrows (*Passer domestiicus*), and rock doves
11 (*Columba livia*). Nonnative invertebrates present in the planning area include Argentine
12 ant (*Iridomyrmex humilis*). Nonnative fish present within various human-made ponds
13 include mosquitofish (*Gambusia affinis*) and various sunfish, while estuarine areas may
14 support yellowfin goby (*Aeanthogobius j/avimanus*). Nonnative amphibian and reptile
15 species include bullfrog (*Rana catesbeiana*), red-eared slider (*Chrysemys pieta*), and the
16 occasional caiman (NPS 2005a).

17 Norway rats have been observed on Alcatraz Island since 1998. The Norway rats are a
18 concern because of their potential as predators of waterbird eggs and chicks on the island.
19 These rats have been known to reduce native rodent populations (NPS 2001).

20

21 **Special Status Wildlife Species**

22 Twenty-five species in Golden Gate National Recreation Area are protected under the
23 Endangered Species Act as amended (16 USC 1536 [a] [2] 1982) and are managed by the
24 National Park Service. Within the park's legislative boundary, there are 69 rare or special
25 status wildlife species currently identified as permanent or seasonal residents of the park,
26 or dependent upon park lands and waters for migration. Of these, 12 are federal-listed
27 endangered, 12 are federal-listed threatened, 1 is state-listed endangered, 3 are state-listed
28 threatened, 31 are federal species of concern, and 10 are state designated species of
29 special concern.

30 Numerous other wildlife species (birds in particular) are considered sensitive by the
31 Audubon Society, Partners in Flight, or the California Department of Forestry, or are
32 designated Migratory Nongame Birds of Management Concern by the U.S. Fish and
33 Wildlife Service (USFWS). Nearly all of the native birds documented in the park are
34 protected under the Migratory Bird Treaty Act (16 USC 528-531). Thirty-eight rare or
35 special status plant species are currently identified within the park. Of those species, 9 are
36 federal-listed endangered, 1 is federal-listed threatened, 13 are federal species of concern,
37 and the remaining 15 species are included or proposed for inclusion by the California
38 Native Plant Society (NPS 2005a).

39 The U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric
40 Administration National Marines Fisheries Service provided a list of federal-listed
41 threatened, endangered, and proposed species for consideration during development of
42 the fire management plan in 2005 (see appendix D). This list was used in the

1 development of this general management plan, since the planning areas for the two plans
2 are identical (NPS 2005a).

3 To evaluate the effects on special status species, a set of species considered likely or
4 possible to experience impacts from GMP actions was selected for assessment based on
5 the presence of suitable habitat within the project area and discussions with NPS
6 biologists. Appendix D, Special Status Species, lists all proposed, or special status
7 candidate species potentially in the planning area and provides a brief summary of
8 presence/absence of suitable habitat.

9 **Marin County**

10 ***Mission Blue Butterfly – Federal Endangered***

11 Mission blue butterflies (*Icaricia icaroides missionensis*) are closely tied to the lupine
12 larval host plants *Lupinus albifrons*, *L. varicolor*, and *L. formoslls*, with *L. albifrons*
13 considered to be the preferred host. These host plants tend to occur in grasslands on thin,
14 rocky soils within broader coastal scrub habitats. Lupine are susceptible to fungal
15 outbreaks, which have been documented to cause rapid contractions of lupine distribution
16 at the Marin Headlands. Competition from nonnative plants, including eucalyptus,
17 Monterey pine, gorse, and broom, also threatens lupine host plants. Lupine is a fire-
18 adapted species, and fire may enhance suitable lupine habitat for mission blue butterflies.
19 Adults feed on nectar from numerous plants, though they may prefer wild buckwheat
20 (*Erigonum latifolium*), golden aster (*Chrysopsis vilosa*), blue dicks (*Brodiaea pulchella*),
21 and Ithuriel's spear (*Brodiaea laxa*). Habitat loss is probably the primary threat to mission
22 blue butterflies, with trampling of host and nectar plants, larvae, and pupae also of
23 concern. Other threats to mission blue butterflies at various stages of their life cycles
24 include parasites, predators, and desiccation and disease during diapause (NPS 2005a).

25 Adults have one generation per year, with a flight period from mid-March to mid-May at
26 the Marin Headlands and late May to mid-June at San Bruno Mountain. Analyses suggest
27 that warmer air temperatures are associated with higher numbers of adults at the seasonal
28 peak and that rainfall is not related to the peak number of adults. Eggs are usually laid on
29 the dorsal surface of larval host plants. Ants (*Prenolepis imparis* and *Formica lasioides*)
30 may tend the later-instar mission blue larvae. Mission blue butterflies occur at the Marin
31 Headlands, Tennessee Valley, Milagra Ridge, and Sweeney Ridge within the planning
32 area (NPS 2005a).

33 ***California Red-legged Frog – Federal Threatened***

34 The California red-legged frog (*Rana aurora draytonii*) is found primarily in wetlands
35 and streams in coastal drainages of central California. Red-legged frogs found north of
36 the Marin-Sonoma county border exhibit intergrade characteristics of the California red-
37 legged frog and the northern red-legged frog. The frog requires specific aquatic and
38 riparian features. Adults require a dense, shrubby, or emergent riparian vegetation closely
39 associated with deep (>0.7 meters) still or slow-moving water. The highest densities of
40 California red-legged frogs have been associated with deep-water pools with dense stands
41 of overhanging willows and an intermixed fringe of cattails. Breeding sites are located up
42 to 26 meters from water in dense riparian vegetation. No critical habitat for the California
43 red-legged frog exists within the planning area. A recent court decision eliminated critical
44 habitat within the planning area by changing the habitat definition. Critical habitat had

1 been defined to include essential aquatic habitat, associated uplands, and dispersal habitat
2 connecting essential aquatic habitat (NPS 2005a).

3 ***Tidewater Goby – Federal Endangered***

4 The tidewater goby (*Eucyclogobius newberryi*) is a small benthic fish that occurs in the
5 upper end of California coastal lagoons in salinities less than 10 parts per thousand.
6 While generally found in coastal embayments, gobies are also known to occur in streams.
7 In San Antonio Creek in Santa Barbara County, the goby is known to occur up to five
8 miles upstream of the lagoon habitat. Within the planning area, tidewater goby is known
9 only from Rodeo Lagoon in the Marin Headlands (NPS 2005a).

10 ***Chinook Salmon – Federal Threatened***

11 Chinook (*Oncorhynchus tshawytscha*) spawning and juvenile rearing habitat occurs in the
12 Sacramento River and tributaries, and large streams and rivers connected to the Pacific
13 Ocean. Adult and juvenile migratory corridors exist along the San Francisco Bay portion
14 of Golden Gate National Recreation Area lands. Critical habitat includes the San
15 Francisco Bay to the Golden Gate Bridge.

16 Recent data indicate that most juvenile chinook salmon are using the Central Bay as a
17 migratory corridor with most juvenile chinook moving along the northern corridor
18 through Raccoon Strait and around the Tiburon peninsula, by Fort Baker, and out to the
19 Golden Gate. Based on the occurrence of juvenile chinook at the Delta pumps and a one
20 month transit time from Chipp's Island to the Golden Gate, winter-run chinook juveniles
21 would be present near the Fort Baker area from January through June, while spring-run
22 chinook juveniles would be present from March through June (MacFarlane 2002).

23 ***Coho Salmon – Federal Threatened***

24 Coho salmon (*Oncorhynchus kisutch*) occur in several creeks within the planning area, as
25 well as the nearshore waters of the Pacific Ocean and estuarine sites such as Bolinas
26 Lagoon and San Francisco Bay. Coho salmon are found in Redwood Creek in Marin
27 County. A single cohort of coho salmon was found in Easkoot Creek (Marin County).
28 Coho are an anadromous species. They are born and reared in freshwater streams; as
29 juveniles, they migrate to estuaries, adjust to saltwater, and then migrate to the ocean to
30 mature into adults. Designated critical habitat for coho in Golden Gate National
31 Recreation Area includes accessible estuarine and stream areas in the coastal watersheds
32 of Marin County except areas above longstanding naturally impassable barriers. Optimal
33 habitat conditions for juvenile coho seem to be deep pools created by rootwads and
34 boulders in heavily shaded stream sections (NPS 2005a).

35 ***Steelhead Trout – Threatened***

36 Steelhead trout (*Oncorhynchus mykiss*) occur in several creeks within the planning area.
37 Steelhead are found in Redwood Creek in Marin County, as well as in the drainages to
38 Bolinas Lagoon and Rodeo Lagoon. In San Mateo County, steelhead are found in West
39 Union Creek, a tributary to San Francisquito Creek. Like coho, steelhead are an
40 anadromous species. Adult steelhead enter Golden Gate National Recreation Area
41 streams in the late winter through spring to reach spawning sites, typically well-aerated
42 areas with small- to medium-sized gravel. Habitat preferences for juvenile steelhead are
43 deep pools created by rootwads and boulders in heavily shaded stream sections, although
44 young-of-the-year steelhead are often forced into shallow-water habitats. The amount of

1 time steelhead rear in freshwater and marine/estuarine habitats is variable, ranging
2 between one to three years. For most drainages, surveys have been conducted for
3 presence or absence of salmonids, while in watersheds supporting coho salmon,
4 abundance data on both species are available. The variable life cycle of steelhead makes
5 population analysis more difficult, but also makes steelhead more resilient to adverse
6 environmental conditions. In general, if the habitat requirements for coho were met,
7 steelhead habitat requirements would also be met (NPS 2005a).

8 In April 2002, the U.S. District Court for the District of Columbia approved a consent
9 decree withdrawing a February 2000 critical habitat designation for steelhead trout.
10 Designated critical habitat for coho includes all accessible estuarine and stream areas in
11 the coastal watersheds of Marin County except areas above longstanding, naturally
12 impassable barriers. Through this designation, NOAA Fisheries identified ten essential
13 features of critical habitat: substrate, water quality, water quantity, water temperature,
14 water velocity, cover/shelter, food, riparian vegetation, space, and safe passage
15 conditions (NPS 2005a).

16 ***California Brown Pelican – Federal Endangered***

17 The California brown pelican (*Pelecanus occidentalis californicus*) is federal-listed as
18 endangered. Nesting is restricted to islands in the Gulf of California and along the outer
19 coast from Baja California to West Anacapa and Santa Barbara islands in southern
20 California. Nonbreeding California brown pelicans range northward along the Pacific
21 Coast from the Gulf of California to Washington and southern British Columbia. The
22 California brown pelican is common in coastal areas of Golden Gate National Recreation
23 Area from April through December. From January through March, pelicans are less
24 frequently seen in the park and in much smaller flocks. The park has significant roost
25 areas for brown pelicans, and they have been observed roosting at Seal Rocks, Alcatraz
26 Island, and in the Marin Headlands at Bird Island and Rodeo Beach (at the western end of
27 Rodeo Lagoon). Bird Island is one of the largest roosting sites in northern California,
28 with up to several thousand pelicans. Pelicans by the hundreds also bathe, feed, and roost
29 in nearby Rodeo Lagoon. When they are on the lagoon, the pelicans tend to use the
30 western two-thirds of the water area, and only occasionally use the eastern third of the
31 lagoon. The pelicans primarily roost at the west edge of the lagoon in the early morning;
32 during storms, they roost on a point of sand near the southwest corner. Brown pelicans
33 prey almost exclusively on surface schooling fishes, especially Northern anchovies and
34 Pacific sardines on the West Coast (NPS 2005a).

35 ***Northern Spotted Owl - Federal Threatened***

36 Lands within Marin County support a northern spotted owl (*Strix occidentalis caurina*)
37 population of possibly 75 pairs. This population is isolated from spotted owl populations
38 to the north by large areas of grassland and shrubs and constitutes the southern end of the
39 subspecies range. Genetic analysis has shown low levels of genetic diversity within and
40 low levels of gene flow between spotted owl populations in Marin County and
41 Mendocino National Forest. The Marin County population supports the highest known
42 density of northern spotted owls rangewide. Threats to spotted owls in the planning area
43 include urbanization, intense recreational pressure, disturbance from wildlife
44 photographers and birders, genetic isolation, West Nile virus, possible catastrophic

1 wildfire, expansion in the range of the barred owl (*Strix varia*), and habitat changes due
2 to Sudden Oak Death.

3 Spotted owls in Marin inhabit coniferous forest, including second growth and remnant
4 stands of Douglas-fir (*Pseudotsuga menziesii*), bishop pine (*Pinus muricata*), coast
5 redwood (*Sequoia sempervirens*), and mixed conifer-hardwood habitats comprised of
6 tanoak (*Lithocarpus densiflorus*), coast live oak (*Quercus agrifolia*), and California bay
7 (*Umbellularia californica*).

8 Spotted owls tend to nest in older stands of conifer and hardwood trees that create a tall
9 overstory. Spotted owls often select larger trees with defects, such as broken tops or
10 mistletoe (*Arceuthobium spp.*) infestations, for nesting, but also have been found nesting
11 in young bay trees in smaller stands. Preliminary pellet analyses indicate that spotted
12 owls forage primarily on dusky-footed woodrats (*Neotoma fuscipes*) in addition to other
13 forest dwelling small mammals and songbirds. Within the planning area, known spotted
14 owl locations are currently limited to Muir Woods and the Stinson Gulch area (NPS
15 2005a).

16 **San Francisco County**

17 **Chinook Salmon – Federal Threatened**

18 Chinook (*Oncorhynchus tshawytscha*) spawning and juvenile rearing habitat is found in
19 the Sacramento River, tributaries, and large streams and rivers connected to the Pacific
20 Ocean. Adult and juvenile migratory corridors exist along the San Francisco Bay portion
21 of Golden Gate National Recreation Area lands. Critical habitat includes San Francisco
22 Bay waters to the Golden Gate Bridge. See further description under Marin County.
23 Chinook within the vicinity of Alcatraz Island are assumed to be present as migrating
24 juveniles and adults. Research indicates that juvenile Chinook salmon are using the
25 Central Bay as a migratory corridor. The waters around Alcatraz Island have been
26 designated as critical habitat for Chinook salmon (NPS 2001).

27 **Western Snowy Plover – Threatened**

28 The Pacific coast breeding population of the western snowy plover (*Charadrius*
29 *alexandrinus nivosus*) is federal-listed as threatened. On March 22, 2004, the U.S. Fish
30 and Wildlife Service determined that substantial information existed to support the
31 possible delisting of the species, and a status review was initiated (USFWS 2004b). This
32 population of snowy plovers occurs along coastal beaches; they nest primarily on sand
33 spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons
34 and estuaries. Snowy plovers nest in coastal Marin County. The western snowy plover
35 occurs within the park at Ocean Beach and Crissy Field from mid July through early
36 May. Snowy plovers have been observed on rare occasions and for short periods of time
37 (over a few days) at Rodeo Beach (May & Associates 2007) and overwintering on Ocean
38 Beach; they also and have been periodically sighted at other beaches. Snowy plovers
39 breeds primarily on coastal beaches from southern Washington to southern Baja
40 California, Mexico (NPS 2005a).

41 **Bank Swallow – State Threatened**

42 Bank swallows (*Riparia riparia*) are colonial nesters, nesting primarily in riparian and
43 other lowland habitats west of the desert. Bank swallows require vertical banks or cliffs

1 near streams, rivers, lakes, or the ocean; they need fine textured or sandy soils in which to
2 dig nesting holes. Erosion by water and wind is important in creating and maintaining
3 banks and bluffs suitable for nesting. Proximity to water is important at all seasons.
4 During migration and in winter, wetlands provide a steady source of insects and a buffer
5 against extreme temperatures. This species nests in the Fort Funston cliffs (NPS 2005a).

6 **San Mateo County**

7 ***Mission Blue Butterfly – Federal Endangered***

8 See prior discussion under Marin County. (

9 ***San Bruno Elfin Butterfly – Federal Endangered***

10 The larval host plant for San Bruno elfin butterflies (*Callophrys mossii bayensis*) is
11 *Sedum spathulifolium*, a succulent that grows on rocky, north-facing slopes along the
12 coast (Lambert 2002). Adults are thought to stay within about 100 meters of host plants.
13 Adults have one generation per year, with flight season from late February to early April.
14 Eggs are laid on the ventral surface of the leaves of host plants. The fourth instar larvae
15 pupate at the base of host plants where they remain through the summer, fall, and early
16 winter. Habitat loss and trampling of host plants, larvae, and pupae are the primary
17 threats to these butterflies. The San Bruno elfin butterfly is known to occur only at
18 Milagra Ridge within the planning area (NPS 2005a).

19 ***San Francisco Garter Snake – Federal Endangered***

20 This San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) is endemic to the San
21 Francisco peninsula and is currently restricted to localities within San Mateo County.
22 This listed species is primarily threatened by the loss and alteration of suitable wetland
23 habitat due to urban development, freeway and road construction, illegal collection,
24 agricultural practices, and trampling. It is considered semi-aquatic and is found along the
25 margins of ponds, lakes, streams, and estuaries (above tidal influx). It feeds on small
26 amphibians and fish, especially the federal-listed threatened California red-legged frog
27 (*Rana aurora draytonii*). The planning area contains three sites (Sweeney Ridge, Milagra
28 Ridge, Mori Point/Sharp Park) that appear to have suitable habitat for the San Francisco
29 garter snake; however, no recent surveys specifically designed to locate the snake and
30 assess habitat have been conducted. Only Mori Point/Sharp Park has had a documented
31 occurrence of the San Francisco garter snake; however, no recent population data are
32 available (NPS 2005a).

33 ***California Red-legged Frog - Federal Threatened***

34 See prior discussion under Marin County.

35 ***Steelhead Trout – Federal Threatened***

36 See prior discussion under Marin County

37 ***Marbled Murrelet – Federal Threatened***

38 The marbled murrelet (*Brachyramphus marmoratus*) nests in old-growth forests or on the
39 ground at higher altitudes where trees cannot grow. The marbled murrelet has
40 experienced a decline in their numbers due to loss of nesting habitat. This member of the
41 auk family feeds at sea in pelagic offshore areas and inshore in protected bays.

42

1 **Special Status Plant Species**

2 Within the areas considered under the *Golden Gate National Recreation Area Fire*
3 *Management Plan*, 26 special status plant species are supported by existing habitat (see
4 appendixD for species listing status). Three are listed by the federal Endangered Species
5 Act as either threatened or endangered. Twenty are listed as federal species of concern or
6 federal species of local concern (species for which the U.S. Fish and Wildlife Service is
7 collecting additional information to determine if they warrant consideration for future
8 listing). Some of these species are also listed on the California endangered species list
9 and three species are of management concern to the park and are listed by the California
10 Native Plant Society on List 4 – “Plants of Limited Distribution” (locally rare). Although
11 these species are not actually listed as threatened or endangered under the federal
12 Endangered Species Act, NPS *Management Policies 2006* states that the National Park
13 Service will inventory, monitor, and manage state-listed and locally listed species in a
14 manner similar to its treatment of federal-listed species. Management policies also state
15 that the Park Service will inventory other species that are of special management concern
16 to parks such as locally rare, declining, sensitive, or unique species (NPS 2005a).

17 ***San Francisco Lessingia – Federal Endangered***

18 The San Francisco lessingia (*Lessingia germanorum*) is federal-listed as endangered. It is
19 found in open sandy soils and dunes in coastal scrub. San Francisco Lessingia has
20 historically been endangered by competition with invasive nonnative vegetation and
21 native scrub vegetation, development, sand quarrying, trampling and recreational
22 activities, incidental use of fertilizers, and other activities (NPS 2005a).

23 ***Montara Manzanita – State Threatened***

24 The Montara manzanita (*Arctostaphylos montaraensis*) is listed as threatened by the state
25 of California. This plant is found in coastal scrub and chaparral habitats. It is endemic to
26 San Mateo slopes, specifically Montara Mountain, and is found at elevations between
27 150 and 500m. It is threatened by development and vehicles (NPS2005a).

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NATURAL RESOURCES – MUIR WOODS NATIONAL MONUMENT

3 INTRODUCTION

4 Muir Woods National Monument is a part of Golden Gate International Biosphere
5 Reserve—one of the planet’s richest and most threatened reservoirs of plant and animal
6 life. Muir Woods National Monument (also referred to as the monument) occupies 558
7 acres of the Central California Coast Range in Marin County, California, only a few
8 miles north of San Francisco.

9 Muir Woods National Monument preserves one of the last remaining ancient redwood
10 forests on the Pacific Coast and in the world. The monument was established in 1908 to
11 protect unique redwood forests that were spared from logging due to their inaccessibility.
12 Specifically, it was created in recognition of the “extraordinary scientific interest and
13 importance because of the primeval character of the forest in which it [the monument] is
14 located, and the character, age, and size of the trees” (Proclamation No. 793, Jan. 9, 1908,
15 35 STAT. 2174). These protected redwoods are the “last contiguous stand of old-growth
16 coastal redwood (*Sequoia sempervirens*) and Douglas fir (*Pseudotsuga menziesii*) in
17 Marin County.” From its inception, the monument was designed to protect the “primeval
18 character” of the redwood forests, and today, “ecological integrity” is a major driving
19 force. (Hall 2009).

20 Surrounding Muir Woods National Monument are mostly protected lands, including
21 other units of the Golden Gate National Recreation Area and lands managed by the state
22 (Mt. Tamalpais State Park) and by the Marin Municipal Water District (MMWD). Muir
23 Woods National Monument is located entirely within the watershed of Redwood Creek.
24 Originating on Mt. Tamalpais (over 2,400 feet in elevation) Redwood Creek flows
25 through the heart of Muir Woods National Monument, bisects Frank Valley, and
26 discharges into the Pacific Ocean at Muir Beach.

27 In addition to preserving the California Coast Redwood, Muir Woods National
28 Monument is home to several federal endangered and threatened species, including the
29 Northern Spotted Owl, Coho Salmon, and Steelhead Trout.

30

31 PHYSICAL RESOURCES

32 Air Quality

33 Muir Woods National Monument is within a Class II air quality area and is located in the
34 San Francisco Bay Air Basin. There are no air quality monitoring stations located at or
35 near monument. Therefore, no specific data are available. See the Gate National
36 Recreation Area section for a description of monitoring information for the general area.

37

38 Carbon Footprint

39 See description under Golden Gate National Recreation Area.

1 **Soils and Geologic Resources and Processes**

2 Muir Woods National Monument is subject to many of the same geologic processes
3 described for Golden Gate National Recreation Area. Slopes are inherently unstable.
4 Intense shearing associated with faulting along the plate margin has reduced the strength
5 of the rock. Ongoing uplift of the mountains causes continued erosion as the landscape
6 strives to become stable. Surface disturbances, such as cuts for trails and roads,
7 vegetation clearing, and alteration of surface water drainages, can trigger or lead to slope
8 failures (NPS 2005a).

9 Auwaerter and Sears (2006, p. 18-19) describe the California Coast Range as:

10 *“a narrow band of low mountains along four hundred miles of coastline on the*
11 *western edge of the North American tectonic plate... characterized by bedrock*
12 *formed from ancient sea floor sediments and igneous rock that was heavily folded*
13 *and uplifted due to lateral slipping along the juncture of the North American and*
14 *Pacific plates.”*

15 Within Muir Woods National Monument, elevations range from 120 to 1,340 feet.
16 Redwood Creek loses approximately 50 feet in elevation from where it enters the
17 monument on the north to where it exits approximately 0.5 miles downstream. Redwood
18 Creek Canyon is the major topographical feature within the monument, and its hillslopes
19 are quite steep, often exceeding 65%. These steep slopes provide considerable shade
20 within the canyon. The monument extends a short distance into Kent Canyon on the
21 northwest, and the newer additions on the southeast occupy a side canyon.

22 **Soils**

23 Based on the lands included within the monument in 1978, six soil complexes were
24 identified within Muir Woods National Monument, which are distinguished by their soil
25 type and slope. Howell et al. (no date) noted that the primary types are Centissima-
26 Barnabe (derived from chert), basalt, and Franciscan formation sandstones. The Redwood
27 Creek canyon floor is characterized as consisting of mostly “gray-podzolic soils” with
28 clay-silt and clay-sand (Hall 2009).

29 **Geology**

30 Faulting and uplift in the Coast Range have left relatively unstable slopes subject to
31 landslides and mass wasting. Valley bottoms have deep alluvial or colluvial fills. The
32 mainstem alluvial valley fill in lower Frank Valley (about 4 miles downstream of the
33 monument) is at least 37 feet deep, and may be locally as deep as 90 feet. Nearly half of
34 the Redwood Creek watershed’s hillslopes are landslide deposits. There are outcrops of
35 rock dispersed throughout the watershed, and in the headwaters, rocks have weathered to
36 soils that can be very thin (<1 ft), although there are reports that soils in the upper
37 Redwood Creek watershed can be as deep as 10 feet (Hall 2009).

38

1 **Water Resources and Hydrologic Processes**

2 ***Surface Water***

3 The Redwood Creek watershed extends from Mount Tamalpais to Muir Beach. Redwood
4 Creek is the dominant hydrologic feature within the Muir Woods National Monument.
5 The Redwood Creek watershed encompasses approximately 8.9 square miles (including
6 Green Gulch Creek, which flows into Big Lagoon). Above the monument, the precipitous
7 headwater tributaries of Redwood Creek (Fern, Spike Buck, and Rattlesnake) descend the
8 steep south slope of Mt. Tamalpais with many waterfalls. These upper tributaries flow
9 through deep, steep canyons, with step-pool channel morphology. Redwood Creek, which
10 is formed by the confluence of Bootjack and Rattlesnake Creeks, flows through the heart
11 of the monument for approximately ½ mile, being fed by several intermittent streams.
12 Fern Creek, which originates on Mt. Tamalpais, flows into Redwood Creek just within
13 the northern boundary of the monument. Once Redwood Creek enters the monument, the
14 channel flattens considerably, to less than a 2% grade, with a bed comprised of mixed
15 gravel and cobble. During the 1930s, Redwood Creek within the monument was lined
16 with rock revetments, and check dams were installed to channelize the creek and protect
17 the old growth redwoods. Since this time, the check dams have been removed and the
18 creek is being returned to a more natural state. Consequently, the section of Redwood
19 Creek that flows through the monument has more riffles and fewer deep water pools than
20 would occur in a highly natural creek with a similar slope (Hall 2009).

21 Below the monument, Redwood Creek is joined by Kent Canyon Creek as it flows
22 through Frank Valley and becomes a relatively broad alluvial floodplain. This stretch has
23 experienced significant impact from agriculture and pasturing and is incised and isolated
24 from its floodplain. Below Frank Valley, the creek enters the ocean at Muir Beach,
25 through a 2.2-acre intermittent tidal lagoon, typically referred to as “Big Lagoon,” which
26 is also fed by Green Gulch Creek. During winter and spring the lagoon experiences tidal
27 influences. As streamflow declines in late spring or summer, the beach berm builds up
28 across the mouth of the creek, blocking surface flow from Redwood Creek to the Pacific
29 Ocean and tidal exchange between the lagoon and Pacific Ocean. Lower Redwood Creek
30 in the Muir Beach area has been altered through water diversions, agricultural levees, the
31 construction of an NPS parking lot, and stream bank alterations. One outcome of this
32 cumulative change has been significant aggradation of the channel (Hall 2009).

33 ***Groundwater and Municipal Water Use***

34 Although most of the Redwood Creek watershed is managed as state and federal park
35 lands, it also provides water for local firefighting, residential, and agricultural uses. Marin
36 Municipal Water District stores water from springs in the upper watershed (upstream of
37 the monument) for firefighting. Downstream of the monument, the Muir Beach
38 Community Services District supplies the Muir Beach Community with water from a
39 well near the creek, and Green Gulch Farm impounds and diverts flow in the Green
40 Gulch sub-watershed. Diversions in Big Lagoon have been abandoned, though the water
41 right remains in place (Hall 2009).

42

1 **Floodplains**

2 Within Muir Woods National Monument, 100-year floodplains are located along
3 Redwood Creek. As a result of natural weather events and the topography and soil
4 characteristics of the area, runoff in the Redwood Creek watershed is high in the winter,
5 with occasional flash floods. Two-year flood magnitudes are estimated at approximately
6 800 cfs, while the 50-year flood magnitude estimate is just over 4,000 cfs. However,
7 during summer, flows are much lower—often below 1 cfs at the Highway 1 bridge—and
8 many tributary streams are intermittent (NPS 2005c).

9 **Water Quality**

10 Water quality monitoring has been conducted at various times and with differing intensity
11 within Redwood Creek and its tributaries. Monitoring has mostly been conducted outside
12 of the monument because most inputs are from agricultural uses and other non-monument
13 related sources. In 2005, Stillwater Sciences designed a water quality monitoring protocol
14 for the watershed that can be used to isolate general areas of contaminant sources. This
15 protocol was implemented once in 2005 as a baseline and may be implemented in future
16 years depending on the availability of funding. A review of a history of water quality
17 sampling in the watershed is compiled in the Existing Conditions Report for the Big
18 Lagoon Wetland and Creek Restoration (Philip Williams & Associates 2003). Don
19 Weeks (2006) issued the Water Resources Foundation Report, a background document
20 on water resources that also identifies relevant laws and policies. Lendvay and Benning
21 (2004) collected baseline water quality data, including pH, alkalinity, metals and ions,
22 temperature, dissolved oxygen, nutrients, and turbidity, at five locations throughout the
23 watershed. Their extensive study compares findings to an earlier, similar study by Madej
24 (1989). In 2008, the Regional Water Quality Control Board established monitoring sites
25 along the length of Redwood Creek as part of their Surface Water Ambient Monitoring
26 Program that is focusing on benthic macroinvertebrates, periphyton, nutrients, and basic
27 water quality parameters (Hall 2009).

28 Field surveys and aerial photograph analysis have been conducted to identify and
29 quantify current and potential future sediment supply from roads, trails, culvert stream
30 crossings, and (to some extent) bank erosion in the Redwood Creek watershed. Sediment
31 sources were assessed for 27 miles of roads and 40 miles of trails, leading to
32 recommendations for erosion control priorities to protect fish and other aquatic species
33 within the watershed. These results were incorporated into a more comprehensive
34 watershed sediment budget developed for the Lower Redwood Creek Restoration Project
35 (Hall 2009).

36 Madej (1989) summarized water quality monitoring that was done between 1986 and
37 1989 in the lower Redwood Creek watershed (below the monument). Most metals were
38 not detected, although there was one unusually high reading for copper (80 µg/L). Later
39 reports attribute this to pesticide use, although this appears to be speculation (NPS 1991).
40 Park staff report that this may have been related to the use of copper hoof treatment used
41 at the stables, a practice that has been discontinued. Levels of coliform bacteria and
42 nitrogen were high, evidently due to horse pastures and agricultural activities at Green
43 Gulch Farm, as well as septic leach. Phillip Williams and Associates (1995) reported the
44 lowest levels of nutrients and bacteria in the headwaters of Redwood Creek and the

1 highest downstream of the monument; the number of organisms per 100 ml was 50
2 upstream of Banducci, 300 below Banducci, and 1900 at Pacific Way. Stillwater Sciences
3 (2005) also report that NPS testing during the 1990s at Muir Woods National Monument
4 found fecal coliform levels within the monument to be within California state thresholds
5 (Hall 2009).

6 Several studies have found that temperatures in Redwood Creek are within the tolerances
7 of salmonids. Lendvay and Benning (2004) reported temperatures across their sample
8 locations to range from 10.8 to 11.0°C in early March and from 14 to 16°C in late April.
9 They concluded that temperatures during spawning season should be cool enough for
10 coho. Their study, conducted from March through April, found dissolved oxygen levels
11 to be adequate for insects and salmon. However, others have found dissolved oxygen
12 levels to be reduced in Big Lagoon in the summer, and this is considered a “key factor”
13 limiting juvenile fish survival (Hall 2009).

14 Lendvay and Benning (2004) determined that most water quality parameters were within
15 EPA standards for aquatic life. Here pH ranged from 7.3 at Muir Beach to 8.0 at Bootjack
16 Creek. Nitrate, though variable, was far below the standard of 90.0 mg/L, suggesting little
17 concern about eutrophication. Somewhat high ammonia readings at specific sites on
18 specific dates might suggest some concern, but the authors said that typical levels were
19 well below the threshold for salmonids in most parts of the watershed. Sulfate levels were
20 extremely low. This study found low levels of copper, in contrast to the levels reported
21 by Madej (1989). Turbidity levels were high on sampling dates following storms, but
22 quickly fell to levels within EPA standards. “The low turbidity levels found in the
23 Redwood Creek watershed suggest conditions suitable for salmonids, aquatic vegetation,
24 and benthic macroinvertebrate populations” (Hall 2009).

25 Other parameters reported by Lendvay and Benning (2004) were out of compliance with
26 EPA standards. Alkalinity measures exceeded the EPA minimum standard for freshwater
27 aquatic habitat of 20.0 mg/L (even the lowest reading, 42.8 at Fern Creek, was
28 significantly above the standard). Phosphate readings, though highly variable, exceeded
29 the guideline of 0.1 mg/L at every site. Aluminum concentrations exceeded the
30 recommended limit for fish at all sites on one date and at two sites on other dates, and the
31 authors concluded that “aluminum may be a threat to aquatic species in Redwood Creek.”
32 Similarly, zinc concentrations were frequently above the EPA limit for freshwater
33 ecosystems, indicating possible negative effects (Hall 2009).

34 Overall, Lendvay and Benning (2004) conclude that the water quality of Redwood Creek
35 is excellent. Despite the fact that some parameters were elevated, in the context of other
36 parameters, such as very healthy benthic macroinvertebrates, these do not seem to be
37 posing significant threats (Hall 2009).

38

39 **BIOLOGICAL RESOURCES**

40 The majority of Muir Woods National Monument (approximately 80%) is occupied by
41 old-growth coastal redwood/Douglas-fir forests in uneven aged stands (NPS 2005c).
42 Although it is difficult to age old-growth redwoods, individual trees on alluvial flats in
43 the monument are estimated to be as much as 1,000 years old.

1 Muir Woods National Monument is located within the center of the California Floristic
2 Province, one of only five regions in the world with a Mediterranean climate. At the
3 landscape scale, plant associations are shaped by aspect, marine influence, and elevation
4 (NPS 2005b). Generally, within San Francisco Area Network, the three provinces
5 represented are the California Coastal Chaparral Forest and Shrub; the California Dry
6 Steppe; and the California Coastal Steppe, Mixed Forest and Redwood Forest. The
7 redwood forests of Muir Woods National Monument fall within the last of these, while
8 around the edges of the monument are small patches of other plant communities that are
9 much more common in parts of Mt. Tamalpais and the Marin Headlands (NPS 2005b).
10 To the southwest is coastal scrub dominated by coyote bush (*Baccharis pilularis*), grasses
11 and forbs; and to the northeast is a mosaic of coast live oak (*Quercus agrifolia*),
12 California bay (*Umbellularia californica*), and chaparral. At the south end of the
13 monument, the Redwood Creek riparian area loses the redwoods and becomes dominated
14 by deciduous trees like red alder (*Alnus rubra*) and broadleaf evergreen trees such as
15 California bay and tanoak (*Lithocarpus densiflora*) (Hall 2009).

16 The monument provides important habitat for federal-listed threatened or endangered
17 species, namely northern spotted owls (*Strix occidentalis caurina*), coho salmon
18 (*Oncorhynchus kisutch*) and steelhead (*O. mykiss*), and several species of bats that are
19 listed as sensitive species. All of these species breed within the monument. Redwood
20 Creek has been identified as “a high priority restoration area for coho salmon” under the
21 California Department of Fish & Game’s 2004 Recovery Strategy. While suitable
22 marbled murrelet habitat has been identified in the monument, there has been no
23 confirmation that this species uses the park for breeding (Hall 2009).

24

25 **Habitat (Vegetation and Wildlife)**

26 ***Plant Communities***

27 Muir Woods National Monument is the only old-growth coastal redwood forest in the
28 Bay Area. It is estimated that nearly 2 million acres of forest similar to those in Muir
29 Woods National Monument once covered a narrow strip along the coasts of California
30 and Oregon. Today, 97% of this area has been impaired or altered and most coastal
31 redwoods now grow on protected second and third growth forests or managed timber
32 plantations. Muir Woods National Monument remains as a very accessible yet prime
33 example of an old-growth forest.

34 Sudden Oak Death (SOD) is a common name given a pathogen (*Phytophthora ramorum*)
35 responsible for widespread tree death throughout northern and central California. This
36 pathogen first appeared in Muir Woods National Monument during the mid-1990s, and
37 although many plants in the redwood forest are affected, the tanoaks have suffered the
38 most.

39 “NPSpecies,” a National Park Service database, documents 263 vascular plant species
40 present in the monument. Approximately 29 other species are probably present, but have
41 not been verified, and 17 species are unconfirmed. Forty-four species are listed as
42 historic, meaning they were previously present but are believed to be extirpated. The
43 basis for this determination is staff knowledge of the site, although no field inventory of

1 plants has yet been completed. A 1966 lichen inventory identified 7 fruticose lichens, 9
2 foliose lichens, and several unidentified species of crustose lichens (Hall 2009).

3 There do not appear to be many native plant species of concern in the monument. The
4 1980 general management plan (NPS 1980) identified the San Francisco wallflower
5 (*Erysimum franciscanum* var. *franciscanum*) and Presidio clarkia (*Clarkia franciscana*)
6 as being species of special status, but no further mention is made of these in subsequent
7 planning documents, and they are not mentioned in current lists of species of
8 management concern. They have never been documented within the monument and
9 evidently their inclusion on the list and in the 1980 plan was an error. Oakland star tulip
10 or mariposa lily (*Calochortus umbellatus*) is described in the fire management plan (NPS
11 2005b) as a California Native Plant Society – listed species, which has been found “in the
12 vicinity of Muir Woods” in grasslands. Additionally, the California bottle-brush grass
13 (*Elymus californicus*) is a federal species of concern; this species prefers coniferous
14 forests and riparian woodlands, and has been documented in the monument (NPS 2005b).
15 The only active management for rare plant species within the monument has been some
16 fencing along the valley floor to protect the California bottle-brush grass, which appears
17 to have been effective (Hall 2009).

18 ***Coast Redwood/Douglas-fir Forests***

19 As noted earlier, most of the monument is comprised of mixed age coast redwood and
20 Douglas-fir (NPS 2005b). In the monument, the redwood forest “extends along the
21 canyon floor north beyond the monument, across most of the northeastern-facing canyon
22 wall up to the Dispsea Trail, and along portions of the lower southwest-facing wall and
23 adjoining side canyons extending to the Ocean View Trail. In these areas, the redwoods
24 thrive in a cool microclimate with loamy soils and ample moisture from fog, rain, and
25 groundwater” (Hall 2009).

26 Although this forest is largely isolated within the larger landscape, due to natural
27 conditions such as physiography and the restricted environmental requirements of
28 redwoods, as well as logging and conversion of lands in the surrounding area, the tracts
29 of forest within the monument have had a serendipitous history of protection that has
30 preserved many of the structural and functional ecological features. The monument’s
31 redwood forests were never logged (McBride & Jacobs 1978), although logging did
32 occur in Conlon Canyon. While it is true that substantial impacts were historically
33 imposed by recreation and tourism (e.g., trampling, campfires, and collecting plants) and
34 park management (stream alteration, removal of woody debris), some of these impacts
35 are of the type that are recoverable from within years or decades. Indeed, studies have
36 shown that areas formerly devoid of vegetation along Redwood Creek have recovered to
37 the point that it is not possible to discern restoration plantings from natural vegetation.
38 On the steep hillsides away from Redwood Creek, it appears that impacts to ecosystems
39 were even more limited. Stillwater Sciences (2005) noted that “understory cover today is
40 probably the most extensive that it has been in a century.” NPS staff considers the health
41 of the redwood forest to be good. Public ownership of surrounding lands is an aspect that
42 helps maintain certain ecosystem functions within the monument’s redwood forests.

43 ***Other Terrestrial Vegetation Types***

44 Outside the redwood and Douglas-fir forests, there are small patches of other vegetation
45 types in the monument that are much more extensive in other parts of the watershed

1 outside the monument. McBride and Jacobs (1978) described five vegetation types:
2 hardwoods, brush, grassland/brush, hardwood/brush, and grassland. These include the
3 habitat types identified in the fire management plan (NPS 2005b) as native hardwood,
4 coastal scrub/chaparral, grassland, nonnative evergreen, and developed. While the
5 redwood forests are largely intact or recovering, these other habitat types have been more
6 extensively altered (Hall 2009).

7 The native hardwood forest (or mixed hardwoods) covers 800 acres of the Redwood
8 Creek watershed (Stillwater Sciences 2005), of which only 59 are within Muir Woods
9 National Monument. These forests have not been well studied. In places like the Monte
10 Vista tract, where development and residential uses have occurred, the hardwood forests
11 have been substantially reduced in extent. Presumably, under NPS management, these
12 areas will begin to return to a more natural state, although there are concerns about
13 invasive species such as eucalyptus, which can dramatically alter forest structure and
14 composition. In areas along Camino del Canyon, various landscape plants have escaped,
15 and invasive exotics such as yellow starthistle (*Centaurea solstitialis*) and French broom
16 (*Genista monspessulana*) are problems. Additionally, the native hardwoods are at great
17 risk from sudden oak death (Hall 2009).

18 The remaining native vegetation types—coastal scrub/chaparral and grassland—have
19 been highly altered, due to a combination of fire suppression, land use practices, and
20 invasion by nonnative species (Stillwater Sciences 2005; NPS 2005b). The coastal
21 scrub/chaparral occurs at upper elevations, and seems to be invading grasslands as a
22 result of fire suppression (NPS 2005b). In turn, coniferous forests are invading the lower
23 elevations of the scrublands. Within the Redwood Creek watershed, most native
24 grasslands, which occupy ridge tops and slopes, have become dominated by nonnative,
25 Mediterranean annual grasses (Stillwater Sciences 2005).

26 ***Invasive Plants***

27 Invasive exotics are a considerable problem within all other habitat types. In fact,
28 approximately one-third of the plants (108 species) identified within the monument are
29 nonnatives, many of which are landscape plants found in the Monte Vista additions.

30 Within the redwood forests, McBride and Jacobs (1978) identified three exotic forbs, but
31 considered them to be rare and not a threat. There are isolated patches of exotic aquatic
32 plants, but these seem to be limited in extent and are relatively stable. Today, there are
33 two main exotic species of concern in the riparian redwoods: the forget-me-not (*Myosotis*
34 *sylvatica* and *Myosotis latifolia*) and panic veldtgrass (*Ehrharta erecta*). Originally
35 introduced to “improve” the aesthetics of the forest, forget-me-nots quickly spread
36 throughout the monument. Fortunately, diligent work by park staff and volunteers has
37 kept this species in check along the canyon floor, although there is concern about the
38 ability to eliminate it from steep, inaccessible slopes. Along Redwood Creek, removal of
39 this species has led to an increase in native plant cover. Outside the riparian forests, the
40 park has worked to eliminate other invasive species, including cape-ivy (*Delairea*
41 *odorata*), brooms (*Genista monspessulana*, *Cytisus scoparius*, *Spartinum junceum*),
42 acacia (*Acacia melanoxylon*, *Acacia decurrens*), and other species (Hall 2009).

43

1 **Aquatic Systems**

2 The major ecosystem elements within the monument that have been altered include the
3 aquatic and riparian systems. For decades, concerted efforts were made to “clean up” the
4 Redwood Creek valley to alleviate problems with flooding and provide an aesthetically
5 pleasing visitor experience. This amounted to removing woody debris from the forests
6 and engineering the creek to create a more consistent gradient and protect its banks from
7 erosion. Most of this was a result of intensive Civilian Conservation Corps (CCC) work
8 during the 1930s, when Redwood Creek within the monument was leveled and rock
9 revetment was installed (Auwaerter & Sears 2006; Stillwater Sciences 2005). The
10 revetment occupies 57% of the total stream bank length (3,541 feet) within Muir Woods
11 National Monument. As late as the early 1990s, woody material was being removed from
12 the stream to prevent logjams that might increase flooding. Channelization has decreased
13 flooding and, consequently, deposition. It has also drastically altered instream
14 morphology, reducing the number and depth of pools and eliminating undercut banks
15 (Fong 2002). Fong’s survey showed that pools occupied only 32% of that portion of
16 Redwood Creek within the monument, with flatwater or shallow riffles being much more
17 extensive. In summer, some riffles become so shallow that fish are forced downstream. A
18 survey in 2003 showed a lower biomass of salmonids was associated with the presence of
19 riprap. The channel immediately downstream of the monument’s boundary, where riprap
20 was never installed, appears more natural than the area within the monument. However,
21 Redwood Creek within the monument has the least amount of fine substrate and more
22 riffles, and therefore the largest number of spawning areas. (Hall 2009).

23 Other impacts to Redwood Creek, both upstream and downstream of Muir Woods
24 National Monument, have impacted ecosystem functions. Sedimentation from upstream
25 associated with roads and culverts have impacted the entire length of the creek. However,
26 sedimentation from roads and culverts is not the major player in channel habitat
27 downstream of the monument. The watershed sediment budget identified and quantified
28 sediment sources to Redwood Creek for three historical periods and included future
29 projections. In the recent past, channel incision was the largest source of sediment to the
30 creek downstream of the monument (57% of total supply 1921-1980). As channel
31 incision slows or ceases, erosion from roads and trails is expected to contribute 23% to
32 total sediment yield in the lower creek. In addition to roads and trails, future sediment
33 sources include hillslope erosion (19%), tributary bank erosion (29%), and channel
34 incision (28%). Additionally, changes at Lower Redwood Creek at Muir Beach appear to
35 have had a significant impact on habitat characteristics necessary for salmon, steelhead,
36 and red-legged frogs. Nevertheless, despite its degraded condition, Lower Redwood
37 Creek “appears to be a major holding area for run-back steelhead adults” (Fong 2002),
38 and its important ecological role has led to it being a high priority for restoration (NPS
39 1999b; NPS & Marin County 2007; Hall 2009).

40 Philip Williams and Associates (1995) characterized the Redwood Creek watershed as a
41 whole as

42 *“unique among California coastal watersheds of its size in that it remains largely*
43 *undeveloped and is protected as state and federal park lands. The creek has largely*
44 *recovered from historical grazing activities in the watershed, and now supports*
45 *sustainable populations of coho salmon.”*

1 Thus, there clearly have been alterations to cover and habitat that have influenced
2 ecological functioning. However, within the larger landscape, the Redwood Creek
3 watershed is a primary target for restoration and maintenance of important habitats. The
4 facts that there are no impoundments, except in the Green Gulch sub-watershed (Martin
5 2000; Philip Williams & Associates 2003) that would severely fragment habitat, and
6 most watershed land is in local, state, or federal government ownership, create opportune
7 conditions for protection (Hall 2009).

8 **Wildlife**

9 Within the Redwood Creek watershed, riparian woodlands provide breeding habitat and
10 forage for 85 bird species and 16 mammal species. Two mammals, the shrew-mole and
11 the broad-footed mole, were found only in this habitat. Nineteen of the bird species and
12 one mammal are species of management concern. Cape-ivy—which is present in the
13 Monte Vista tract but not yet in the redwoods—has had documented impacts on the
14 diversity of bird species (Hall 2009).

15 Redwood/Douglas-fir forest in the Redwood Creek watershed provide habitat for 30 bird
16 species and 20 mammals. Hall observed that “this habitat supports an average-to-high
17 bird diversity and low bird abundance compared to other habitat types in the watershed.”
18 Mammals that are preferentially associated with these forests include deer mouse
19 (*Peromyscus maniculatus*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis*
20 *virginiana*), trowbridge shrew (*Sorex trowbridgii*), Sonoma chipmunk (*Tamias sonomae*),
21 western gray squirrel (*Sciurus griseus*), and raccoon (*Procyon lotor*) (Howell et al. no
22 date); 17 species of concern (4 bats and 13 birds) have been detected in this habitat type
23 (Hall 2009).

24 **Mammals**

25 According to NPSpecies, 27 mammal species are confirmed present in Muir Woods
26 National Monument, while 9 are unconfirmed. Domestic and feral cats, local dogs, and
27 turkeys are presently considered pests. None of the mammals is considered at risk of
28 exploitation. Howell et al. (no date), in a mammal survey, documented black-tail deer
29 (*Odocoileus hemionus*), meadow vole (*Microtus pennsylvanicus*), and opossum, which do
30 not appear in the NPSpecies list. Additionally they documented domestic dogs
31 (“unconfirmed” in NPSpecies) and western spotted skunk (*Spilogale gracilis*) (“false
32 report” in NPSpecies). NPSpecies lists no “historic” (extirpated) species, but various
33 historic documents suggest that several large mammals, like bears, were historically
34 present but disappeared as long ago as the late 1800s. The NPSpecies data provide no
35 information on nativity, abundance, or residency for the mammals in the monument (Hall
36 2009).

37 Among the mammal species, only bats have received significant investigation. Habitat
38 for bats in Muir Woods National Monument is considered high quality, and the diversity
39 of species is notable—Heady and Frick (2004) reported 10 species foraging and/or
40 roosting in the monument; this number represents 69% of the species that are likely to
41 occur in the region. Redwoods are particularly good habitat because they provide hollows
42 and crevices for roosting. There are four federal species of management concern (SOMC)
43 and one species on the US Forest Service sensitive species list. The Townsend’s big-
44 eared bat (also called the Pacific western big-eared bat) occupies humid coastal regions

1 of California, roosting in caves, mines, buildings, and fire scars (NPS 2005b). It is very
2 sensitive to disturbance and suffers from a lack of suitable roosting sites; because of their
3 large cavities, large diameter redwoods offer some of the only suitable habitat. The
4 fringed myotis occurs in a wide variety of habitats, although it prefers foothill hardwoods
5 and hardwood-conifer forests and has been considered preferentially associated with
6 redwood forests. The long-legged myotis is most common above 4,000 ft in primarily
7 coniferous forest habitats. It uses trees as day roosts and creates nursery colonies in
8 hollow trees. This has led to increased protection of fire scars. The Yuma myotis prefers
9 open woodlands and forests, and requires still water sources that attract prey insects. It is
10 quite tolerant of human habitation. Little is known about the western red bat (Forest
11 Service sensitive species), although it is known to roost in cottonwoods and willows and
12 is thought to be migratory (Hall 2009).

13 ***Birds***

14 Over 50 species of birds have been identified in Muir Woods National Monument over a
15 year's time. Their abundance and periods of song vary with time of day, season, and
16 weather conditions. A deep, wooded redwood canyon is a specialized habitat. Although
17 this old growth forest supports spotted owls (*Strix occidentalis caurina*) and pileated
18 woodpeckers (*Dryocopus pileatus*), the overall lack of food is the primary reason for the
19 apparent scarcity of birds. There are few insects in a redwood forest, as the tannin repels
20 insects and the deep shade limits the number of flowers and fruits produced.

21 In addition, federal-threatened northern spotted owls nest in coniferous and mixed-
22 hardwood forests surrounding Muir Woods National Monument. The monument also
23 contains potential marbled murrelet (*Brachyramphus marmoratus*) habitat, but no
24 breeding murrelets have been detected in two years of surveys.

25 The following quotation from the superintendent's annual report for 1923 indicates little
26 change during the past 80 years in the bird life found in Muir Woods:

27 *"Birds, as is generally the case in a redwood forest, are conspicuous by their*
28 *absence—Steller's jays being the only bird seen in any numbers."*

29 Fifty-nine bird species are confirmed present in the monument, according to NPSpecies,
30 although the 1999 resource management plan indicated that "at least 69 bird species
31 occupy Muir Woods" (NPS 1999b). Seven are migratory species, and 23 are known to
32 breed within the monument. The only federal-listed threatened species is the spotted owl,
33 which breeds in and near the monument. Although Muir Woods National Monument
34 appears to provide habitat suitable for marbled murrelets, which nest only in redwood
35 trees, none have been detected, despite a focused inventory. Appendix D, which provides
36 detailed information about all special status species, lists two State Species of Concern in
37 Muir Woods National Monument: Cooper's hawk (*Accipiter cooperi*) and sharp-shinned
38 hawk (*A. striatus*). Inventories in 2000 did not detect either hawk species. However,
39 Allen's hummingbird (*Selasphorus sasin*) and hermit thrush (*Catharus guttatus*)—both
40 species of management concern—were observed, as well as the chestnut-backed
41 chickadee (*Parus rufescens*), which is on the Audubon watch list. According to their
42 point count data, the Pacific-slope flycatcher (*Empidonax difficilis*), a species of
43 management concern, was the most common bird; it was observed at 93% of the census
44 points. The other most common species were winter wrens (65%), chestnut-backed

1 chickadees (56%), golden-crowned kinglets (54%), brown creepers (47%), and dark-eyed
2 juncos (30%) (Hall 2009).

3 ***Amphibians and Reptiles***

4 NPSpecies lists five amphibians as present within the monument along with two species
5 that were documented historically, but are no longer present, the foothill yellow-legged
6 frog and yellow-eyed ensatina (*Ensatina eschscholtzii xanthoptica*). Yellow-legged frogs
7 were collected in 1954, but they were not found in 1993 within the monument, and Hall
8 noted that this species is “now very rare or absent” in areas where it formerly was
9 abundant. Very little information is available about the abundance or status of many of
10 these amphibian species (Hall 2009).

11 The nonnative signal crayfish has long been established in Redwood Creek and Fern
12 Creek. It is the only nonnative aquatic species in the monument. It is possible that this
13 species displaced the native sooty crayfish (*Pacifastacus nigrescens*) (Hall 2009).

14 The California giant salamander (*Dicamptodon ensatus*) is found from Sonoma to Santa
15 Cruz County, particularly in humid coastal conifer forests. A recent survey found that
16 salamander larvae were rare in the main stem of Redwood Creek, but more abundant in
17 tributaries. Fong and Howell noted that the signal crayfish and giant salamander were
18 rarely found together in any stream habitat type, but they were unable to determine
19 whether the crayfish were displacing the salamanders from preferred habitats. They noted
20 that, because crayfish tend to favor pools, actions that might be taken to restore stream
21 features such as pools could increase the abundance of crayfish (Hall 2009).

22 NPSpecies lists 12 reptile species as present within Muir Woods National Monument.
23 The abundance, residency, and nativity of most of these species are unknown. Very little
24 is reported about any of these species in any planning or research reports. However, the
25 Pacific (western) pond turtle (*marmorata*, formerly *Clemmys marmorata*), a federal
26 species of concern, is listed as present in the monument, although none of the recent
27 aquatic habitat assessments make mention of it (Hall 2009).

28 ***Fish***

29 An old-growth forest is very interconnected; through time, many of the plants and
30 animals become reliant on one another. One example at Muir Woods National Monument
31 is found in Redwood Creek. The redwoods depend on the creek for most of their water
32 and the trees help keep the gravel in the creek clean by stabilizing the soil. The trees also
33 help keep the temperature of the stream cool and constant. As the trees die and fall into
34 the creek, they create pools and enrich the stream with their nutrients. Since salmon need
35 clean gravel, constant water temperature, and pools for spawning, Redwood Creek
36 provides good habitat for salmon. It is one of the last streams in California to still have its
37 native stock of salmon, due largely to the undisturbed forest surrounding it. Both coho
38 (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) are found in
39 Redwood Creek.

40 There are four native fish species present in the monument, although additional species,
41 including some nonnative fish, occupy lower reaches of Redwood Creek. The two most
42 significant species—targets of extensive monitoring—are coho salmon (recently
43 upgraded federally to endangered status) and steelhead (federal-listed as threatened).
44 Redwood Creek is critical habitat for both; Muir Woods National Monument provides

1 good spawning habitat but, due to loss of pools and structure, juvenile rearing habitat is
2 very limited. Both runs have been considered stable, although significantly reduced from
3 historic times (Hall 2009).

4 The Redwood Creek coho are part of the Central California Ecosystems Study Unit,
5 found in three watersheds in the Park Service's San Francisco Bay Area Network (NPS
6 1999a). However, genetic analysis shows that the coho in Redwood Creek are a
7 genetically distinct subgroup that is not closely related to other coho in the same ESU
8 (NPS & Marin County 2007). Spawning occurs between December and February,
9 depending on when storm flows increase enough to permit returning adults to breach the
10 sandbar at Big Lagoon. Emergence occurs in March and April, and the juveniles remain
11 in fresh water for approximately 15 months, before heading to the ocean for 16 months.
12 This cycle creates three "year-classes" of fish; for instance, the fish returning to spawn in
13 2007-08 were from the 2004-05 year class. Given their lifecycle, habitat requirements
14 vary; fish need habitat for spawning, juvenile rearing and migration, growth to adulthood,
15 and adults need migration corridors (NPS & Marin County 2007). Juvenile rearing
16 habitat with refugia and shelter appears to be especially limiting in Redwood Creek. Big
17 Lagoon's altered environment does not provide high quality salmonid rearing habitat
18 (Hall 2009).

19 ***Nonnative Wildlife***

20 A few nonnative mammals have been of concern to the monument. In the past, feral hogs
21 (*Sus scrofa*) were widespread in Golden Gate National Recreation Area (including Muir
22 Woods National Monument), but they have been largely controlled (NPS 1999b). They
23 can seriously degrade habitat, disturb soils, compete for food, and transmit diseases. Feral
24 cats and domestic dogs (unconfirmed), though not major concerns, can present problems
25 for native wildlife (Hall 2009).

26 There have been anecdotal reports of chukars (*Alectoris chukar*), an exotic species, near
27 but not yet within the monument. Also, wild turkeys are considered nonnative and
28 increasing in and around Muir Woods National Monument. This species was introduced
29 by California Department of Fish and Game for hunting, but Golden Gate National
30 Recreation Area considers it invasive and uncontrolled. It competes with native species
31 for food and has been known to harass people. NPS staff are contemplating small pilot
32 removals (Hall 2009).

33

34 **Special Status Species**

35 ***Coho Salmon – Federal Threatened***

36 Coho salmon (*Oncorhynchus kisutch*) occur in several creeks within the planning area, as
37 well as the nearshore waters of the Pacific Ocean and estuarine sites such as Bolinas
38 Lagoon and San Francisco Bay. Coho salmon are found in Redwood Creek in Muir
39 Woods National Monument. A single cohort of coho salmon was found in Easkoot Creek
40 (Marin County). Coho are an anadromous species; born and reared in freshwater streams,
41 as juveniles they migrate to estuaries, adjust to saltwater, and then migrate to the ocean to
42 mature into adults. Designated critical habitat for coho in Golden Gate National
43 Recreation Area includes accessible estuarine and stream areas in the coastal watersheds

1 of Marin County except areas above longstanding naturally impassable barriers. Optimal
2 habitat conditions for juvenile coho seem to be deep pools created by rootwads and
3 boulders in heavily shaded stream sections (NPS 2005a).

4 **Steelhead Trout – Federal Threatened**

5 Steelhead (*Oncorhynchus mykiss*) are found in Redwood Creek which flows through
6 Muir Woods National Monument, as well as the nearshore waters of the Pacific Ocean
7 and estuarine sites such as Bolinas Lagoon and San Francisco Bay. Like coho, steelhead
8 are an anadromous species. Adult steelhead enter Golden Gate National Recreation Area
9 area streams in the late winter through spring to reach spawning sites, typically well-
10 aerated areas with small- to medium-size gravel. Habitat preferences for juvenile
11 steelhead are deep pools created by rootwads and boulders in heavily shaded stream
12 sections, although young-of-the-year steelhead are often forced into shallow-water
13 habitats. The amount of time steelhead rear in freshwater and marine/estuarine habitats is
14 variable, ranging between one and three years. For most drainages, presence/absence
15 salmonid surveys have been conducted, while in watersheds supporting coho salmon,
16 abundance data on both species are available. The variable life cycle of steelhead makes
17 population analysis more difficult, but also makes steelhead more resilient to adverse
18 environmental conditions. In general, if the habitat requirements for coho were met,
19 steelhead habitat requirements would also be met (NPS 2005a).

20 In April 2002, the U.S. District Court for the District of Columbia approved a National
21 Marine Fisheries Service consent decree withdrawing a February 2000 critical habitat
22 designation for steelhead trout. Designated critical habitat for coho includes all accessible
23 estuarine and stream areas in the coastal watersheds of Marin County except areas above
24 longstanding, naturally impassable barriers. Through this designation, NOAA Fisheries
25 identified ten essential features of critical habitat: substrate, water quality, water quantity,
26 water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe
27 passage conditions (NPS 2005a).

28 **Northern Spotted Owl – Federal Threatened**

29 Marin County supports a northern spotted owl (*Strix occidentalis caurina*) population of
30 possibly 75 pairs. This population is isolated from spotted owl populations to the north by
31 large areas of grassland and shrubs and constitutes the southern end of the subspecies
32 range. Genetic analysis has shown low levels of genetic diversity within and low levels of
33 gene flow between spotted owl populations in Marin County and Mendocino National
34 Forest. The Marin County population supports the highest known density of northern
35 spotted owls rangewide (NPS 2005a).

36 Spotted owls tend to nest in older stands of conifer and hardwood trees that create a tall
37 overstory. Spotted owls often select larger trees with defects, such as broken tops or
38 mistletoe (*Arceuthobium spp.*) infestations, for nesting, but also have been found nesting
39 in young bay trees in smaller stands. Preliminary pellet analyses indicated that spotted
40 owls forage primarily on dusky-footed woodrats (*Neotoma jUscipes*) in addition to other
41 forest dwelling small mammals and songbirds. Within the planning area, known spotted
42 owl locations are currently limited to Muir Woods National Monument and the Stinson
43 Gulch area (NPS 2005a).

1 Northern spotted owls within the monument are at the southernmost extreme of the
2 species range, and the population in Marin County is genetically isolated, although
3 relatively large; 161 distinct nests were been documented between 1998 and 2003
4 (Stillwater Sciences 2005). This species was listed at the federal level as threatened in
5 1990. Monitoring in the county over the past several years has shown stable fecundity,
6 with approximately 0.5 female young fledged per breeding female and nearly 90% of
7 nests being occupied for the past several years. Old redwood forests are important nesting
8 habitat; 43% of nests in Marin County are in redwood trees and 36% are in Douglas-fir
9 trees. Across northern California, owls were found to select locations with large diameter
10 conifer overstory and an understory of large hardwoods. The mean diameter of platform
11 nest trees in Marin County is 91 cm. Two pairs have historically nested within Muir
12 Woods National Monument or immediately adjacent to the monument (Hall 2009).

13 There are several threats to spotted owls in the region, although the habitat conditions
14 within the monument itself are presently of high quality. Urban development destroys
15 habitat, owls are especially susceptible to West Nile virus (first confirmed in Marin
16 County in 2005), and Sudden Oak Death may affect both nesting habitat and prey
17 species. Additionally, there are anecdotal reports of people disturbing nests and luring
18 owls with mice. Finally, the barred owl is suspected of displacing spotted owls in Marin
19 County. This species, once limited to the eastern United States, has been extending its
20 range over the past century and is now found throughout the Pacific Northwest and in
21 California. Aggressive behavior toward spotted owls has been documented in Marin
22 County, and in 2005, a male barred owl was detected in the monument for the fourth year
23 in a row, which coincided with the second year of spotted owl nest failure in the
24 monument. In 2007, the first breeding pair of barred owls was observed, and breeding
25 was observed again in 2008 (Hall 2009).

26 Kelly et al. (2003) conducted extensive historical analysis of the location of spotted owl
27 and barred owl territories at five study areas in Oregon and Washington from 1987 to
28 1999. They concluded that there had been a steady increase in the number of barred owls
29 at all long-term spotted owl monitoring sites, and that when barred owls invade, the
30 occupancy of territories by spotted owls declines significantly. They believe that “land
31 managers and regulatory agencies should regard barred owls as a threat to spotted owls.”
32 There is some debate about whether the barred owl in Muir Woods National Monument
33 should be considered native or not (it is listed as such in *NPSpecies*, but other park
34 planning documents list it as invasive and uncontrolled). Nevertheless, barred owls have
35 been identified as the primary threat to spotted owl recovery in the US Fish & Wildlife
36 Service’s final recovery plan. NPS staff consider the barred owl to be a species of
37 concern, and feel a need to track and potentially manage the species due to its potential
38 impact on spotted owls. It appears that the presence of the breeding barred owls in the
39 monument has displaced the historically nesting spotted owls (Hall 2009).

40 ***Marbled Murrelet – Federal Threatened***

41 See description Habitat in San Mateo County

42

CULTURAL RESOURCES – GOLDEN GATE NATIONAL RECREATION AREA

3

4 Golden Gate National Recreation Area is home to a remarkable constellation of cultural
5 resources, among the most diverse in the entire national park system. The park includes
6 the traditional homelands of the Coast Miwok and Ohlone peoples; more than 190
7 inventoried archeological sites, some of which predate European contact and constitute
8 the most tangible connection between the Coast Miwok and Ohlone communities and
9 parklands; more than 700 historic structures (5 National Historic Landmarks, 12
10 properties listed in the national register of Historic Places, and 7 properties determined
11 eligible for National Register listing), most related to military and maritime commercial
12 themes stretching over a period of more than 200 years; and 9 documented cultural
13 landscapes, including rural landscapes and dairy ranches. Remnants associated with
14 agricultural pursuits that were carried on by the same families for generations remain
15 extant in the park, comprising a rich legacy of folkways, rural landscapes, and
16 architecture. The park's cultural resources nationally significant seacoast fortifications
17 and military installations that span the Spanish, Mexican, and American eras and
18 illustrate the military architectural and engineering heritage of the United States and the
19 broad patterns of the nation's history. Other cultural resources include an array of
20 buildings, sites, and features that reflect the local and regional historical industrial,
21 commercial, and recreational development of the San Francisco Bay Area, including the
22 bay's European discovery (i.e., San Francisco Bay Discovery Site National Historical
23 Landmark); maritime-related resources such as historic lighthouses, wharves, piers,
24 docks, shipwrecks, and other shore-side embarkation points; and remnants of the area's
25 historic ranching/agricultural, logging, and mining activities.

26 Although best known for its sinister reputation as the maximum security, minimum-
27 privilege federal penitentiary that housed some of America's most notorious criminals
28 between 1934 and 1963, Alcatraz, a 22.5-acre island in San Francisco Bay that serves as
29 one of park's iconic features, contains layers of history left over from its prior uses as a
30 military fort, military prison, federal penitentiary, and as the site of the occupation by
31 Indians of All Tribes during 1969-71. Alcatraz Island was opened to the public as part of
32 Golden Gate National Recreation Area in 1973, listed in the national register of Historic
33 Places in 1976, and designated as a National Historic Landmark in 1986.

34 Golden Gate National Recreation Area includes recently-acquired lands in San Mateo
35 County. Currently, little comprehensive information is available regarding the cultural
36 resources associated with these lands. However, a historic resource study is underway
37 that will identify and evaluate the significance of cultural resources and themes
38 associated with the San Mateo lands.

39

40

1 **NATIONAL HISTORIC LANDMARKS**

2 **Definition:** National historic landmarks are buildings, sites, districts, structures, and
3 objects that have been determined by the secretary of the interior to be nationally
4 significant in American history and culture. National historic landmarks possess
5 exceptional value or quality in illustrating or interpreting the heritage of the United States
6 in history, architecture, archeology, technology, and culture, and possess a high degree of
7 integrity of location, design, setting, materials, workmanship, feeling, and association.

8 National historic landmarks are significant because they

- 9 • Are associated with events that have made a significant contribution to, and are
10 identified with, or that outstandingly represent, the broad national patterns of
11 United States history; or
- 12 • Are associated importantly with the lives of persons nationally significant in the
13 history of the United States; or
- 14 • Represent some great idea or ideal of the American people; or
- 15 • Embody the distinguishing characteristics of an architectural type specimen
16 exceptionally valuable for the study of a period, style, or method of construction,
17 or that represent a significant, distinctive, and exceptional entity whose
18 components may lack individual distinction; or
- 19 • Are composed of integral parts of the environment not sufficiently significant by
20 reason of historical association or artistic merit to warrant individual recognition
21 but collectively compose an entity of exceptional historical or artistic
22 significance, or outstandingly commemorate or illustrate a way of life or culture;
23 or
- 24 • Have yielded or may be likely to yield information of major scientific importance
25 by revealing new cultures, or by shedding light upon periods of occupation over
26 large areas of the United States.

27 **Resources:** The secretary of the interior has designated five national historic landmarks
28 within, adjacent to, or near the boundaries of Golden Gate National Recreation Area:

- 29 Presidio of San Francisco
- 30 Fort Point National Historic Site
- 31 San Francisco Port of Embarkation
- 32 Alcatraz Island
- 33 San Francisco Bay Discovery Site

34
35 ***Presidio of San Francisco National Historic Landmark.*** Established in 1776 by the
36 Spanish, and continued as a military post under the Mexicans and the Americans, the
37 Presidio possesses a visual unity and a high degree of integrity that relates well to its
38 historical importance and continuity through successive periods of development.

1 The Presidio of San Francisco was the oldest Army installation operating in the American
2 West and was one of the longest-garrisoned posts in the country. More than 200 years of
3 military occupation of the Presidio have resulted in the development of a complex
4 historic district of several overlaid historic landscapes, each composed of buildings,
5 structures, objects, sites, and other features that represent at least eight distinct phases of
6 development.

7 The breadth and diversity of contributing resources are vast and include a veritable
8 outdoor museum of military and related architecture. The significance of the Presidio is
9 unequaled by any post in the country and rests not only on resources within post
10 boundaries, but also on the preeminence of two adjacent and interrelated landscapes: the
11 urban development of the city of San Francisco and the natural geography of San
12 Francisco Bay. Further, no other military reservation within a major United States city is
13 as large as the Presidio and so prominently located within the surrounding urban setting.
14 For more than 100 years, the post served San Francisco as a man-made forested reserve
15 amidst the city's dense residential development; the lush character of the Presidio as a
16 wooded reserve has endured to the present day.

17 The important interrelationship between the Presidio and the city of San Francisco has
18 been part of a broader interrelationship between the Presidio and the entire Bay Area. As
19 headquarters for the protection of the Bay and for military expeditions throughout the
20 West, the Presidio remained strategically the most significant military post on America's
21 Pacific Coast during most of its extended history, until its closure in 1994. Contributing
22 resources (approximately 660) include buildings and structures, archeological sites, and
23 cultural landscapes and their associated features.

24 ***Fort Point National Historic Landmark (also a National Historic Site).*** Constructed
25 between 1853 and 1861, Fort Point is the only example of a casemated Third System fort
26 completed on the Pacific Coast. It is also the most unaltered such fort left in the United
27 States. Situated on the southern tip of the Golden Gate, the fort was a vital part of San
28 Francisco's harbor defense during the Civil War, and played a role in defending the
29 harbor entrance in World War I and World War II.

30 ***San Francisco Port of Embarkation National Historic Landmark.*** During the early
31 months after the United States entered World War II, the U.S. Army's San Francisco Port
32 of Embarkation shipped more military supplies than all other military ports in the United
33 States combined.

34 The statistical returns for the entire war showed that San Francisco was second only to
35 New York in the numbers and amounts of personnel shipped to the war zones. Between
36 December 1941 and August 1945, 1,745,000 personnel embarked at San Francisco. In
37 addition, more than half a million veterans of the war debarked at San Francisco during
38 the same period. An equal number came through the Golden Gate after conclusion of the
39 hostilities.

40 All American dead being returned to the United States from the Pacific were brought
41 through the port. Japanese and German prisoners of war were processed through this
42 port's facilities.

1 More than 25 million measurement tons of cargo were shipped through San Francisco.
2 For various periods of time between 1941 and 1944, the ports of Los Angeles, California;
3 Portland, Oregon; and Seattle, Washington were administered by San Francisco. In the
4 Bay Area, Fort Mason oversaw port operations for no fewer than 13 other installations.
5 San Francisco was the primary port for Army troops and supplies in the central, south,
6 and southwest Pacific areas. Moreover, the task force that drove the Japanese from
7 Alaska's Aleutian Islands was mounted from San Francisco.

8 ***Alcatraz Island National Historic Landmark.*** Alcatraz Island, which attracts high levels
9 of visitation due to its notoriety, includes cultural landscapes, historic structures, museum
10 collections, and stories associated with its use as a Civil War fort, military prison, federal
11 penitentiary, and the site of the Indian Occupation of 1969-71. The island has been the
12 site of events that have had a significant impact on the nation as a whole from before the
13 Civil War through the Indian Occupation because of its strategic location in the San
14 Francisco Bay. Its significance in the areas of military history, social history (penology),
15 and maritime commerce (related to gold) is enhanced by the integrity of its resources
16 which results from the fact that access to the island has been strictly limited throughout
17 its history.

18 Maritime commerce was aided by the first U.S. lighthouse on the Pacific Coast built on
19 the island in 1854; its successor still serves. First garrisoned on December 30, 1859, the
20 post was officially designated Alcatraz Island but was often referred to as Fort Alcatraz.
21 By the start of the Civil War, Alcatraz was the key fort in the center of the most
22 significant Pacific port in 19th century America, mounted the first permanent cannon on
23 the west coast of the United States, and featured a brick and masonry defensive barracks,
24 known as the "Citadel," that may have been unique in the annals of American military
25 architecture. Alcatraz was designated as the official military prison for the entire
26 Department of the Pacific on August 27, 1861, and was the first official army prison in
27 the nation.

28 When Alcatraz became a civilian penitentiary in 1934, it quickly gained nationwide
29 attention due to its association with many of the most infamous criminals of the gangster
30 era and the bloody escape attempts made from there. It is representative of the far end of
31 the penology spectrum, since it was a prison designed for punishment and incarceration
32 only, not rehabilitation. It is of national importance in this regard because of its use as a
33 repository of incorrigibles throughout the federal prison system, including Robert Stroud
34 ("Birdman of Alcatraz"), Alphonse Capone, and George Kelly Barnes ("Machine Gun
35 Kelly"). Alcatraz Island is certainly the best known prison in American history and
36 arguably, along with France's "Devil's Island," may be the most infamous prison in the
37 world.

38 Alcatraz Island was occupied by "Indians of All Tribes" from November 1969 to June
39 1971 during an internationally publicized protest to focus attention on the plight of
40 American Indians and to assert the need for Indian unity and solidarity for achieving self-
41 determination and securing political rights. Thus, the occupation increased awareness of
42 the American Indian's political, economic, and social concerns and provided foundation
43 for what would become a political movement – the American Indian Movement – to
44 promote racial pride and secure and protect Indian rights. Tangible evidence of their

1 occupancy on the island includes graffiti and physical alterations attributed to their
2 actions.

3 The period of significance for Alcatraz stretches from 1847, when the island was first
4 surveyed for military fortifications, to 1971 when the National Park Service acquired the
5 land. This period of significance covers the military fortifications period (1847-1907),
6 military prison period (1861-1933), federal prison period (1933-63), and American Indian
7 occupation period (1969-71). The current landscape of Alcatraz consists of features and
8 characteristics from each of the island’s historically significant periods that are used to
9 define cultural landscapes—buildings, structures, spatial organization, circulation, small-
10 scale features, topography, vegetation, natural systems and features, archeological sites,
11 and land use.

12 ***San Francisco Bay Discovery Site National Historic Landmark.*** This National Historic
13 Landmark on the crest of Sweeney Ridge commemorates the site from where the main
14 body of Spanish explorer Gaspar de Portola’s expedition first sighted San Francisco Bay
15 on November 4, 1769. The bay would become the most important harbor on the Pacific
16 Coast of the United States and one of the great anchorages of the world.

17 Additionally, two nomination studies for potential designation of national historic
18 landmarks within the park are currently being prepared by National Park Service
19 personnel and includes: Coastal (Seacoast) Fortifications and the Golden Gate Bridge.

20 ***Coastal Seacoast Fortifications.*** The seacoast fortifications of San Francisco Bay today
21 comprise what is widely considered to be the most comprehensive collection of military
22 architecture and coastal defense systems and the finest surviving examples of military
23 engineering for coastal defense in the United States. The significance of the seacoast
24 fortifications structures of the Bay Area as a group is of the highest order. Moreover, as
25 well-preserved examples of nearly every important development in military fortification
26 architecture and engineering from before the Civil War to the guided missile era, they
27 embody an extraordinary range of distinguishing characteristics of military architecture,
28 engineering, style, and construction and outstandingly illustrate military culture and
29 technique. They are tangible manifestations of changing periods in the nation’s history
30 and of its changing military responses, and provide associative links with people
31 important to the history of the nation as a whole, from John C. Fremont and “Kit” Carson
32 to Irvin McDowell and Douglas MacArthur. The military reservations that provide a
33 relatively unchanged physical context for these fortifications also provide a spectacular
34 scenic backdrop of largely undeveloped open space at the very edge of a great urban
35 metropolis. This open space is not only a defining factor in the San Francisco Bay
36 region’s world-renowned scenic beauty, but became the core of land around which
37 Golden Gate National Recreation Area was established in 1972 as the first of the nation’s
38 urban national park areas.

39

40 **NATIONAL REGISTER OF HISTORIC PLACES**

41 **Definition:** The National Register of Historic Places is a list of properties (districts, sites,
42 buildings, structures, and objects) that possess the quality of significance in American
43 history, architecture, archeology, engineering, and culture, and also possess integrity of

1 location, design, setting, materials, workmanship, feeling, and association. Properties
2 listed in the national register are significant for the following attributes:

- 3 • The properties are association with events that have made a significant
4 contribution to the broad patterns of our history; or
- 5 • The properties are association with the lives of persons significant in our past; or
- 6 • The properties embody distinctive characteristics of a type, period or method of
7 construction, or that represent the work of a master, or that possess high artistic
8 values, or that represent a significant and distinguishable entity whose
9 components may lack individual distinction; or
- 10 • The properties have yielded, or may be likely to yield, information important in
11 prehistory or history.

12

13 **Resources:** Eleven properties within Golden Gate National Recreation Area have been
14 listed in the National Register of Historic Places:

- 15 Forts Baker, Barry, and Cronkite
- 16 Fort Mason Historic District
- 17 Point Lobos Archeological Sites
- 18 Six-inch Gun No. 9 (Baker Beach)
- 19 Fort Miley
- 20 Muir Beach Archaeological District
- 21 *S.S. Tennessee* Shipwreck Site (and remains)
- 22 *King Philip/Reporter* Site (and remains)
- 23 Camera Obscura
- 24 Point Bonita Light Station
- 25 Olema Valley Historic District

26 ***Forts Baker, Barry, and Cronkhite.*** These military fortifications and installations
27 comprise some of the earliest coastal defense artillery batteries in Marin County and are
28 significant in tracing the development of the American defense system. The land on
29 which they were constructed, strategically located at the northern point of the Golden
30 Gate, commands the approaches to the San Francisco Bay entrance.

31 In 1866, Forts Baker and Barry were acquired by purchase to be used for military
32 defense. Fort Cronkhite was acquired in the same manner in 1914 but was considered a
33 portion of Fort Barry until officially designated as Fort Cronkhite in 1937. The
34 fortifications proposed for construction at the northern point of the Golden Gate were to
35 augment those at the Presidio of San Francisco and elsewhere in San Francisco to prevent
36 successful passage of hostile ships through the Golden Gate into the Bay. The batteries
37 and their ancillary structures (observation posts and garrisons) created a coordinated
38 system of defense at the Golden Gate. From the Civil War to the Cold War eras, this
39 system of defense offered equipment ranging from smoothbore breach-loading guns to

1 rifled, break loading guns, including emplacements for 155 mm anti-motor torpedo and
2 90 mm anti-aircraft guns to Nike anti-aircraft missiles.

3 **Fort Mason Historic District.** Beginning in 1797 and lasting through the Spanish and
4 Mexican administrations of Alta California, Fort Mason (including Batteria San José,
5 Punta Medanos, Battery Yerba Buena, Point San José, Black Point, and Post of Point San
6 José) was one of two sites in San Francisco Bay that was armed with artillery for the
7 defense of the harbor.

8 For over forty years of American administration, Fort Mason played a role in the coastal
9 defenses of the bay from the Civil War to the post-Spanish American War era. It also
10 served as an important element in the first submarine mining of San Francisco Bay during
11 the Spanish American War. From the Spanish American War to the Korean War, Fort
12 Mason was the headquarters of the San Francisco Port of Embarkation.

13 Fort Mason contains a collection of military structures dating from the 1850s to the
14 Korean Conflict that illustrates the evolution of an army post and seacoast fortifications
15 over a period of some 100 years. The contrasts and many moods of the architecture, the
16 effect of the Army's caste system on the quarters, the charm of the earliest officers' row,
17 the simple lines of the Endicott battery, the Works Progress Administration architecture
18 of the Great Depression, and the Army's determination in landscaping all blend together
19 to present a history of this place and its times. The historic district also includes five
20 archeological sites associated with prehistoric Coast Miwok native peoples.

21 **Point Lobos Archeological Sites.** These three midden sites constitute a cluster of similar
22 appearing sites, in close proximity, which may have once been a larger deposit of cultural
23 materials. Although no diagnostic artifacts or dated materials have derived from these
24 sites, it is possible that they date to post 500 AD, or represent campsites of the historic
25 Costanoan peoples of San Mateo, San Francisco, and other nearby counties. They are
26 very likely the last remaining visible evidence of the occupancy of the San Francisco
27 region by pre-European contact Native Californians.

28 **Six-inch Gun No. 9 (Baker Beach).** This six-inch breech-loading rifle on disappearing
29 carriage is one of only two such guns that survived the scrapping of coastal defense
30 ordnance following World War II; it is the only one with a recoiling mechanism that can
31 be moved between firing and loading positions. It embodies the distinctive characteristics
32 of a type, period, and method of construction associated with Endicott-period seacoast
33 defense ordnance, representative of the golden age of coast artillery dating from the last
34 decade of the 19th century and the early decades of the 20th century. Thus, it is a rare,
35 surviving example of once common weaponry. This gun was constructed at the
36 Waterville Arsenal at Troy, New York in 1908, It was built from a 1905 model, and its
37 carriage was built from a 1903 design,

38 **Fort Miley.** The battery emplacements, fire control stations, and searchlight facilities of
39 East and West Fort Miley were part of the defense system for the strategic harbor of San
40 Francisco, long regarded by army engineers and strategists as the most important harbor
41 on the west coast of the United States.

42 The fortification of Point Lobos in 1899 marked the final phase of the Endicott system of
43 seacoast defense, when it was realized that the guns and mortars should be placed as far

1 toward the sea as possible and that the inner harbor defense represented by the early
2 Endicott-type batteries was of less importance.

3 The guns of Fort Miley, together with those of Fort Barry on the northern side of the
4 Golden Gate, became San Francisco Bay's important "outer line of defense" at the turn of
5 the century. The massive concrete and earth batteries, Chester and Livingston,
6 represented the latest in design and engineering of the Endicott works as of 1900. Later
7 installations at Fort Miley, such as a coastal searchlight powerhouse and fire control
8 stations for other and later batteries, mark further advances in the theory, practice, and
9 technology of seacoast defenses.

10 Fort Miley's continuing importance in the harbor defenses of San Francisco is illustrated
11 by construction of a 6-inch gun battery during World War II and the subsequent arming
12 of this battery as late as 1948—the last of the coastal guns to be mounted in the San
13 Francisco Bay Area.

14 ***Muir Beach Archeological District.*** The local significance of the archeological district is
15 based on the potential data it may contain, its geographical position along the western
16 coast of Marin County, and its probable association with the proto-historic Coast Miwok
17 native populations of the Central California coast north of San Francisco. The site is an
18 important link between the several known surviving midden sites on the San Francisco
19 Peninsula at Fort Mason and Point Lobos and those known for the Bolinas Lagoon and
20 town area.

21 ***SS Tennessee Shipwreck Site (and remains).*** The *S.S. Tennessee*, a side-wheel
22 commercial passenger-cargo steamer, owned by the Pacific Mail Steamship Company
23 and destined for Panama, crashed against the rocks in Indian (Tennessee) Cove, some
24 three miles north of Point Bonita on March 6, 1853, amid dense fog and high surf. Today
25 the Tennessee Valley Trail leads visitors to the cove where the ship's remains may be
26 seen.

27 ***King Philip/Reporter Site (and remains).*** The *King Philip*, a three-masted wooden
28 clipper ship named for the Indian chief who was involved in King Philip's War in 1675,
29 crashed on Ocean Beach amid heavy surf on January 25, 1878, after leaving San
30 Francisco without cargo. First launched in 1856, the ship went into the lumber trade
31 working for Pope and Talbot of San Francisco after its glory days as a clipper. The ship's
32 remains appear every 20 years or so.

33 ***Camera Obscura*** – The Camera Obscura, located near the Cliff House restaurant perched
34 on the cliffs just north of Ocean Beach, is the last remaining structure of the world
35 famous Playland at the Beach. The Camera Obscura, listed in the National Register of
36 Historic Places for its engineering significance, projects an image of the surroundings
37 onto a horizontal viewing surface via a reflected image from a viewpoint at the top of the
38 building using only existing exterior light sources, usually sunlight. A metal hood in the
39 cupola at the top of the building slowly rotates, making a full revolution in about six
40 minutes, allowing for a 360-degree view around the building. Light enters the building
41 via an angled mirror in the metal hood. It is then passed through a lens with a 150-inch
42 focal length and is projected onto a parabolic white "table" in a black room. Built by
43 Floyd Jennings in 1946, it was constructed with the permission of George K. Whitney,
44 Sr., then owner of the Cliff House, Sutro Baths, and Playland. While the exterior of the

1 building was extensively modified in 1957 to appear as a giant camera, the internal
2 workings of the Camera Obscura, the basis of its placement in the national register,
3 remain unchanged since the original structure was erected in 1946. This structure
4 provides spectacular scenic panoramic views with vivid colors.

5 ***Point Bonita Historic District.*** The Point Bonita Historic District, located at the entrance
6 to San Francisco Bay from the Pacific Ocean, includes both the Point Bonita Light
7 Station and the Point Bonita Life-Saving Station. Established in 1855 to mark the
8 entrance to San Francisco Bay and to warn of local navigational hazards, the district is
9 linked to the historic growth of commercial shipping along the West Coast and to
10 California's critical reliance on maritime transportation and the aids that made navigation
11 possible. The light station contains an intact lighthouse tower with an intact lens and an
12 associated fog signal building. The tower and fog signal building, clustered together at
13 the end of the rocky point, retain a high degree of integrity and give cohesiveness to the
14 station site. This is heightened by the buildings' separation from the main access path by
15 a pedestrian suspension bridge; Point Bonita is the only lighthouse in the United States
16 approached by a suspension bridge. The light station retains the general form of a formal
17 late 19th/early 20th century light complex.

18 ***Olema Valley Ranches Historic District.*** The Olema Valley Ranches Historic District
19 includes within its boundaries twenty former dairy ranches, all of which were extant
20 during the 19th century when the Olema Valley was one of the leading Marin County
21 dairy producers and Marin County was the most important dairy producer in the state of
22 California. While the dairy operations are no longer functioning, the structures associated
23 with those operations remain on most of the individual ranches, and livestock operations
24 continue on most.

25 The Olema Valley was the location of portions of three former Mexican-era land grants.
26 Of the 20 ranches that comprise the Olema Valley Ranches Historic District, many were
27 settled and developed by people whose title derived directly from either Rafael Garcia or
28 Gregorio Briones, the Mexican grantees. Numerous immigrants from the Azores,
29 Switzerland, Spain, and Ireland settled here and are represented in today's population;
30 thus, the district is significant in the areas of ethnic heritage and social history. The
31 remains of the original road route between San Rafael and Olema and Olema and Bolinas
32 are locally significant as pioneer routes of transportation. The remaining rail bed of the
33 North Pacific Coast/Northwestern Pacific Railroad along Lagunitas Creek is of statewide
34 significance as an important shipping and passenger operation (1874-1933) between San
35 Francisco and the northern Bay Area counties. The Olema Valley ranches shipped their
36 dairy products by wagon to Bolinas, Olema, or San Rafael for shipment to San Francisco
37 markets by schooner, or later to the railroad along Lagunitas Creek.

38 The essential character of the Olema Valley, which possesses local historical significance
39 and merits preservation is its turn-of-the-century rural ambience, largely unimpaired by
40 intrusive modern buildings or housing developments. Each ranch or former ranch site,
41 bounded by fence lines whose locations have not changed in more than a century,
42 contributes to the historic district. Each ranch has a variety of contributing structures and
43 features, including buildings, roads, fields, or plantings, that retain a high degree of
44 integrity.

1 Six properties within Golden Gate National Recreation Area have been formally
2 determined eligible by the California State Historic Preservation Officer for listing in the
3 National Register of Historic Places:

- 4 Golden Gate Bridge
- 5 Sarah Seaver Randall House
- 6 Hill 640 Military Reservation
- 7 Golden Gate Dairy
- 8 Miwok Ranch
- 9 Point Bonita Lifesaving Station

10 **Golden Gate Bridge.** The Golden Gate Bridge is a suspension bridge spanning the
11 Golden Gate, a narrow 400-foot deep strait that serves as the mouth of San Francisco
12 Bay. As part of both U.S. Route 101 and State Route 1, it connects the city of San
13 Francisco on the northern tip of the San Francisco Peninsula with the Marin Headlands at
14 the far southern end of Marin County. The Golden Gate Bridge was the longest
15 suspension bridge span in the world when it was completed in 1937, and has become an
16 internationally recognized symbol of San Francisco and California. Since its completion,
17 the span length has been surpassed by eight other bridges. It still has the second longest
18 suspension bridge main span in the United States after the Verrazano-Narrows Bridge in
19 New York City. In 2007, the Golden Gate Bridge was ranked fifth on the *List of*
20 *America's Favorite Architecture* by the American Institute of Architects.

21 **Sarah Seaver Randall House.** William Edgar Randall and John Nelson purchased a herd
22 of cattle in Oregon in 1856 and drove them to the Olema Valley, where they established a
23 dairy ranch on 1,440 acres purchased from Rafael Garcia, an aging Mexican soldier who
24 had secured a Mexican land grant. Nelson sold out in 1860 and moved to Olema. Randall
25 was killed by his neighbor, Benjamin Miller, later that year, and the ranch passed to his
26 wife Sarah. With the assistance of her children, Sarah Randall developed a prosperous
27 dairy operation. The two-story Victorian house was constructed in 1880-81. The wood
28 frame structure with brick foundation constructed in the Italianate style remains on the
29 property. The ranch passed to several other owners before its eventual purchase by the
30 National Park Service in 1974. The house is significant for its association with the dairy
31 industry and Victorian architecture, as well as for this pioneer woman's contribution to
32 local history.

33 **Hill 640 Military Reservation.** This reservation and the remains of its radar set and fire
34 control stations are prime examples of the methods that evolved for the better direction of
35 coast artillery fire against enemy vessels at sea. Overlooking the Pacific Ocean and the
36 southern end of Stinson Beach, they are the best surviving representatives of the most
37 northerly complexes of fire control installations for the defense of San Francisco Bay
38 during the critical years of World War II. The radar, a surface detector set, was the first of
39 its type assigned to the San Francisco Harbor defenses.

40 Many of the military structures have been adaptively used by the park and a variety of
41 park partners. These uses include administration, educational centers, artists' studios,
42 residential leasing, and overnight accommodations.

1 **Golden Gate Dairy.** The Golden Gate Dairy in the Tennessee Valley of the Marin
2 Headlands is one of the last agricultural operations with historic integrity of what was
3 once dozens of Portuguese-owned dairies in southern Marin County. The main house was
4 built ca. 1898-1900 by Azorean immigrant M.A. Mattos. The Lopez family operated a
5 Grade A dairy here ca. 1943-62. The site contains several residences, corrals, utilitarian
6 structures, fence lines, pastures, and windbreaks.

7 **Miwok Ranch (Rapozo Ranch).** The Rapozo Ranch in the Tennessee Valley of the Marin
8 Headlands, currently operated as the Miwok Ranch or Stables, is one of the last
9 agricultural operations with historic integrity of what was once dozens of Portuguese-
10 owned dairies in southern Marin County. The main house was probably built ca. 1903 by
11 Azorean immigrant M.F. DaCunha, the first single owner of the ranch. The ranch was
12 used by the Rapozo family from 1945 to the present. The site contains a hay barn, riding
13 barn, sanitary (dairy) barn, two residences, corrals, a eucalyptus windbreak, and other
14 ranching features.

15 **Fort Funston.** Also known as *Rancho Laguna de La Merced* and Laguna Merced
16 Military Reservation, this historic military installation contributed to the strategically
17 important coastal defense of San Francisco Bay through the crucial period of World War
18 II, during which its armament was the primary defense against an enemy approach from
19 the south.

20 Fort Funston contributed to the advancement of engineering and design of seacoast
21 fortifications. The planning and construction developed the prototypical casemates of
22 Battery Davis, which were used for the protection of guns from aircraft bombing attacks.
23 Battery Davis's construction marked the introduction of the mighty 16-inch gun batteries
24 on the Pacific Coast of the United States. Later, the site became the location for a Nike
25 missile battery—the defensive weapon that first replaced the traditional cannon.

26

27 **CULTURAL LANDSCAPE RESOURCES (INCLUDING HISTORIC** 28 **BUILDINGS AND STRUCTURES)**

29 For the purposes of the “Affected Environment” discussion, consideration of cultural
30 landscape resources will include an integrated discussion of historic buildings and
31 structures. In the “Environmental Consequences” section of the planning document,
32 historic buildings and cultural landscape resources (including historic structures) will be
33 considered as separate categories of cultural resources per guidelines specified in
34 Director’s Order 28: *Cultural Resource Management Guideline* and by the National
35 Register of Historic Places.

36

37 **Cultural Landscapes**

38 **Definition:** Cultural landscapes are geographic areas, including both cultural and natural
39 resources and the wildlife or domestic animals therein, associated with a historic event,
40 act, or person exhibiting other cultural or aesthetic values. Cultural landscapes are the
41 result of the long interaction between people and the land and reflect the influence of
42 human beliefs and actions over time upon the natural landscape. Shaped through time by

1 historical land-use and management practices—as well as politics and property laws,
2 levels of technology, and economic condition—cultural landscapes provide a living
3 record of an area’s past and a visual chronicle of its history.

4 **Types:** The National Park Service recognizes four types of cultural landscapes, none of
5 which are mutually exclusive. These are historic site; historic designed landscape,
6 historic vernacular landscape, and ethnographic landscape.

7 **Cultural Landscapes Inventory:** The cultural landscapes inventory (CLI) is a National
8 Park Service database containing information on the historically significant landscapes
9 within the national park system. The following cultural landscapes have been identified
10 within the park. Some, but not all of these cultural landscapes have been inventoried or
11 evaluated:

- 12 Alcatraz Island
- 13 Bolinas Copper Mines
- 14 D Ranch, Rapozo Ranch, and Golden Gate Dairy in Tennessee Valley
- 15 Fort Funston
- 16 Fort Mason Historic District
- 17 Fort Miley
- 18 Hill 640 Military Reservation
- 19 Marin Headlands (Forts Baker, Barry, and Cronkhite, and Miwok Trail
20 components)
- 21 Olema Valley Ranches Historic District (Cheda Ranch, Five Brooks, Hagmaier
22 Ranch, McFadden Ranch, McIsaac Ranch, Ralph Giacomini Ranch, Stewart
23 Ranch, Teixeira Ranch, Truttman Ranch, Wilkin’s Ranch, and Zanardi Ranch
24 components)
- 25 Phleger Estate
- 26 Point Bonita Light Station/Point Bonita Lifesaving Station
- 27 Presidio of San Francisco (Coastal Bluffs, Crissy Field, and Golden Gate Bridge
28 components)
- 29 Dipsea Trail
- 30 Milagra Ridge
- 31 Rancho Corral de Tierra
- 32 Sweeney Ridge

33

34 **Historic Buildings and Structures**

35 **Definitions:** Historic buildings are defined as enclosed structures with walls and a roof,
36 consciously created to serve some residential, industrial, commercial, agricultural, or
37 other human use.

38 Historic structures constitute constructed works, usually immovable by nature and design,
39 consciously created to serve some human activity. Examples of structures include
40 monuments, dams, roads, railroad tracks, canals, millraces, Indian works, ruins,

1 fences/walls, revetments, and outdoor sculpture. In the National Register of Historic
2 Places program, “structures” are limited to functional construction other than buildings.
3 Thus, the “Environmental Consequences” section of this general management plan
4 historic structures will be considered as elements of cultural landscape resources.

5

6 **MUSEUM COLLECTIONS**

7 **Definition:** Museum collections are prehistoric and historic objects, artifacts, works of
8 art, archival documents, and natural history specimens valuable for the information they
9 provide about processes, events, and interactions among people and the environment.

10 **Resources:** U.S. Military history, from 1846 to the 1990s, is one of Golden Gate National
11 Recreation Area’s major themes. Much of the park lands are comprised of former
12 military fortifications and installations. Consequently, museum collections related to this
13 theme receive greatest emphasis in order to support the history of the sites found within
14 the park and present a balanced picture of this important aspect of the park’s history. The
15 park has a museum collection of more than 4.2 million objects, including archeological
16 and historical objects and archives, oral histories, maps, and historic documents and
17 records, the majority of which are related to the military history of the park. Of particular
18 importance are the documents, maps, and engineering drawings relating to the layout,
19 construction, development, and operation of the park’s military sites and installations as
20 well as its fortifications.

21 Museum collections related to the military history of the park as well as Alcatraz Island
22 are strongly associated with the park’s themes, time periods, people, and events. The
23 numerous historic structures have generated furnishings, archives, and related artifacts in
24 the park’s museum collections. Archeological investigations have resulted in systematic
25 excavations of materials in the collection. The military history of the park and Alcatraz
26 history are well represented by uniforms, weapons, artillery, island escape evidence and
27 documentation, photographs, and archival materials.

28 The park’s museum collections consist of the following components:

- 29 1. Archival collections (approximately 4.2 million items) include historic
30 photographs, documents, and plans, mostly related to the Presidio of San
31 Francisco and the federal penitentiary at Alcatraz [95% Presidio-related].
- 32 2. History collections (9,100 plus items) include the original FBI evidence from the
33 1962 Alcatraz escape; original uniforms, other accoutrements, and everyday
34 objects from Alcatraz; memorabilia and objects from the Panama Pacific
35 International Exposition; architectural examples from park historic structures; 6th
36 U.S. Army Band material; NIKE missile collections; 33 cannon dating from the
37 17th through the 20th centuries; and Presidio, San Francisco, and California-
38 related materials from the former Presidio Army Museum [65% Presidio-related].
- 39 3. Archeology items (3,700 plus items) include materials from sites within Fort
40 Mason, including the collections from the excavation of the Black Point Battery,
41 and materials from the Presidio of San Francisco (Spanish, Mexican, and
42 American period items) [80% Presidio-related].

- 1 4. Natural History collections (2,100 plus items) include a fossil from Alcatraz,
2 some geological specimens, a small herbarium, and inventory and monitoring
3 collections of butterflies [99% Presidio-related].

4
5 Golden Gate National Recreation Area houses its museum collections in 15 separate
6 facilities throughout the park that function as visitor centers, interpretive exhibits, or
7 dedicated storage areas. Of the four largest storage repositories, three are located in
8 buildings owned by the Presidio Trust with no lease agreements in place. The lack of a
9 lease places park museum collections in a vulnerable position due to potential eviction,
10 and deteriorating structural conditions. There is a historic tie between the park's museum
11 collection and that of San Francisco Maritime National Historical Park because San
12 Francisco Maritime was part of the park until 1988 and the themes and resources are
13 inextricably tied together. Under an agreement between the two parks, San Francisco
14 Maritime NHP continues to house and provide limited management of most of the non-
15 Presidio materials in Building E of Lower Fort Mason, which is part of Golden Gate
16 National Recreation Area.

17 The current conditions for museum collections in the park do not meet National Park
18 Service standards for the long-term preservation, protection, and use of museum
19 collections. Staffing for the museum collections has never been stable, thus precluding
20 realistic access for researchers, the general public, and park staff. Although planning has
21 been underway for some 15 years, a suitable location for the park's museum collections
22 has yet to be finally determined.

23

24 **ARCHEOLOGICAL RESOURCES**

25 **Definition:** Archeological resources are the physical evidence of past human activity,
26 including evidence of the effects of that activity on the environment. Information
27 revealed through the study of archeological resources is critical to understanding and
28 interpreting prehistory and history. Although archeological and ethnographic resources
29 (which are covered in the following section) are considered as separate cultural resource
30 types by the National Park Service, the two are closely inter-related.

31 **Resources:** Currently, there are more than 190 inventoried archeological sites in the park.
32 Continuing research and expanding knowledge of the parks' resources during recent
33 years has resulted in identification of additional archeological sites. Archeological sites in
34 the parks are associated with the following themes/topics:

- 35 • Pre-Contact Period (Prior to Contact between Indigenous and European Peoples)
- 36 • Historic/Spanish, Mexican, and American Periods
- 37 • Military Reservations/Installations
- 38 • Seacoast Fortifications
- 39 • Ranching/Agriculture

- 1 • Logging
- 2 • Lighthouse/Life Saving Reservations
- 3 • Shipwrecks and Associated Remains
- 4 • Refuse Dumps
- 5 • Recreational Development

6

7 **ETHNOGRAPHIC RESOURCES**

8 **Definitions:** Ethnographic resources include sites, structures, objects, landscapes, or
9 natural resource features assigned traditional legendary, religious, subsistence, or other
10 significance in the cultural system of a group traditionally associated with them.

11 Traditional Cultural Properties are ethnographic resources eligible for listing in the
12 National Register of Historic Places. Traditional Cultural Properties are associated with
13 cultural practices, beliefs, the sense of purpose, or existence of a living community that is
14 rooted in that community's history or is important in maintaining its cultural identity and
15 development as an ethnically distinctive people.

16 Currently, there are no identified ethnographic resources within the boundaries of Golden
17 Gate National Recreation Area, Alcatraz Island has very important historical significance
18 to American Indians.

19 **History:** Native Americans have called the San Francisco Bay region home for more
20 than 10,000 years, and the park still contains archeological sites and landscapes
21 influenced by native land management and activities. Park areas south of the Golden
22 Gate, from the San Francisco Peninsula to the East Bay and south to Monterey, are the
23 aboriginal lands of the Ohlones (also called Costanoans). Park lands north of the Golden
24 Gate, primarily in Marin County and southern Sonoma County, are the aboriginal lands
25 of the Coast Miwoks.

26 Both the Ohlone and Coast Miwok peoples were organized into small, politically
27 independent societal groups or tribes; the Ohlones had about 50 tribes and the Coast
28 Miwoks had approximately 14 tribes. Ethnohistory suggests that small villages were
29 maintained along the marshlands. In San Francisco, the villages were located at present-
30 day Fort Mason, Crissy Field, and Sutro Baths. In Marin County, the Coast Miwok
31 encampments were located near present-day Horseshoe Cove at Fort Baker and at Big
32 Lagoon and Muir Beach. Groups moved annually between temporary and permanent
33 village sites in a seasonal round of hunting, fishing, and gathering. Periodic burning of
34 the landscape was conducted to promote the growth of native grasses for seed gathering
35 and to create forage for deer and elk. The worldview and spirituality of both the Ohlones
36 and Coast Miwoks were expressed in a complex woven tapestry of stories, myth, song,
37 dance, and ritual.

38 In 1776, when Spanish military and civilian settlers arrived in the San Francisco Bay area
39 to establish military garrisons (presidios), Franciscan missions, and civilian settlements
40 (pueblos), life abruptly and dramatically changed for the region's native peoples. With

1 Spanish colonization came the introduction of new diseases and the establishment of
2 mission communities meant to supplant the existing tribal organization.

3 Because they lived close to the Presidio's military garrison, members of the Ohlone tribes
4 that inhabited the San Francisco Peninsula, called the *Yekanu*, were baptized and taken
5 into the missions as early as the 1770s and 1780s. Because the Coast Miwok tribes lived
6 further north, their indoctrination occurred somewhat later. In 1783, several members of
7 the *Huimen* community, who inhabited the southernmost part of Marin County, were the
8 first of the Coast Miwok to leave their homeland for Mission San Francisco. By 1810,
9 introduced ideas, forced labor, and efforts to indoctrinate the indigenous peoples into an
10 alien society and religion led to the destruction of the way of life of the Ohlones and
11 Coast Miwoks.

12 Today, descendants of Ohlone and Coast Miwok peoples live throughout the San
13 Francisco Bay area. Ohlones are organized into eight tribal bands, none of which are
14 federally recognized, although several are seeking recognition. While participating in
15 contemporary society, they are actively involved in the preservation and revitalization of
16 their native culture. Restoration of native language, protection of ancestral sites, practice
17 of traditional plant uses, story-telling, dance, song, and basket weaving are all aspects of
18 these restoration efforts. The National Park Service works with Ohlones in stewarding the
19 preservation and interpretation of ancestral sites in the Presidio and throughout the park
20 south of the Golden Gate. Additionally, the Park Service has a government-to-
21 government relationship with the Coast Miwoks who today form a single, federally
22 recognized tribe, the Federated Indians of Graton Rancheria, whose recognized status
23 was restored by congressional legislation in 2000. Though none of the Ohlone tribes is
24 currently recognized, they all have submitted petitions for federal recognition. Thus, the
25 nature of the park's relationship with these tribes will become government-to-government
26 if/when any of their petitions are successful.

27 **Sites:** Native peoples were severed from their homelands in the park for two centuries
28 due to European and American colonialism, irreparably rupturing their traditional
29 connections to place; this magnifies the significance of indigenous archeological sites as
30 focal points of native heritage today. Providing stark evidence of the presence of native
31 people on parklands in the past, these sites serve as the platform upon which Coast
32 Miwoks and Ohlones today stand and proclaim their existence.

33 Indigenous archeological sites, such as the Point Lobos Archeological Sites, the Muir
34 Beach Archaeological District, and sites at/near Big Lagoon, Crissy Field, the Phleger
35 Estate, and Fort Mason Historic District, constitute the most tangible connection between
36 Coast Miwok and Ohlone peoples and the parklands, and provide a basis for
37 understanding the history of their life ways and cultures. Most of the known indigenous
38 archeological sites in the park are below ground and stable, although sites located along
39 the coast, in unstable geological areas, and at the edge of bluffs, are subject to erosion.
40 The park's oldest archeological site (dating from ca. 150 AD) consists of shell material
41 found at Land's End.

42 Threats to the archeological/ethnographic resources include development, "pot-hunting,"
43 and inadvertent damage as a result of visitor use of the park. The greatest threat of all
44 may be ignorance; because only a small fraction (approximately 10 percent) of the park

1 has been surveyed for archeological sites, the park has a profound lack of knowledge
2 with regard to site identification and significance evaluation.

3 **Collaboration:** In the late 1990s—in equal measures due to evolving National Park
4 Service policy and to the rekindling of California Indian tribal life—the park made its
5 first efforts to reach out and work with the Coast Miwok and Ohlone communities. Since
6 the late 1990s, the National Park Service has worked on a consistent basis with the
7 Federated Indians of Graton Rancheria (the federally-recognized tribe comprised of park-
8 associated Coast Miwoks and Southern Pomos), with the many Ohlone tribes seeking
9 federal recognition, and with Ohlone individuals who partake in the stewardship of
10 Ohlone heritage. Cooperative work has encompassed a broad range of park activities
11 such as consultation on the identification, inventory, and treatment of cultural resources,
12 collaboration on the interpretation of native history, genealogy, and culture and Indian-
13 led educational programs, teacher training for Native American curricula, permanent and
14 temporary exhibits on native history and culture, annual commemorative festivals with
15 native components, and the permitting of religious activities on parklands and gathering
16 of natural materials for use in traditional crafts. Recent natural resource restoration
17 projects involving the identification and preservation of indigenous archeological sites
18 (i.e., the Crissy Field tidal marsh and planned Big Lagoon restoration projects) have
19 inspired an interest in exploring the re-creation of ethnographic landscapes as a value-
20 added component of natural resource restoration.

21 **Alcatraz Island:** Although there are no identified ethnographic resources in Golden Gate
22 National Recreation Area, Alcatraz Island has very important historical significance to
23 American Indians. After Alcatraz became part of Golden Gate National Recreation Area,
24 each November the International Tribal Council conducted an annual “Unthanksgiving”
25 sunrise ceremony on the island. The island was occupied by “Indians of All Tribes” from
26 November 1969 to June 1971 as an internationally publicized protest to focus attention
27 on the plight of American Indians and to assert the need for Indian unity and solidarity
28 for achieving self-determination and securing political rights. Thus, the occupation
29 increased awareness of the American Indian’s political, economic, and social concerns
30 and provided foundation for what would become a political movement—the American
31 Indian Movement—to promote cultural pride and secure and protect Indian rights. The
32 Occupation resulted in the nation’s increased awareness of American Indian concerns and
33 issues and establishment of D-Q University at Davis, California, as well as other
34 institutions throughout the nation. A 20th and later 30th anniversary commemoration
35 were also held on the island to remember the Indian Occupation. Tangible evidence of
36 the Occupation on the island includes painted political slogans and symbols on the
37 buildings and physical alterations attributed to the Indians’ activities. Since the
38 Occupation the island has become a symbolic focal point of American Indian pride and
39 solidarity among relocated American Indians in the San Francisco Bay area as well as the
40 nation at-large. Thus, the National Park Service recognizes the ethnographic significance
41 of Alcatraz Island for American Indians and the island’s potential for listing in the
42 national register as a Traditional Cultural Property.

43

CULTURAL RESOURCES – MUIR WOODS NATIONAL MONUMENT

3

4 Muir Woods National Monument remains an enduring and renowned example of natural
5 resource conservation in the United States. The redwood forest, long recognized for its
6 significance as a natural resource, is also historically significant—along with its overlay
7 of cultural resources—for its association with the history of the American conservation
8 movement, early conservation efforts in the Bay Area, and the legacy of rustic design in
9 the National Park Service.

10 Muir Woods National Monument is nationally significant as an early and lasting example
11 of natural resource conservation by the federal government. The monument was
12 designated on January 9, 1908, by President Theodore Roosevelt, who acted in large part
13 on the advice and support of Gifford Pinchot, Chief of the United States Forest Service.
14 The creation of Muir Woods National Monument occurred at the beginning of the federal
15 government’s proactive role in conservation and preservation of natural and historic
16 resources. Muir Woods National Monument was the tenth monument designated under
17 the Antiquities Act of 1906, and the first designated through as donation of private
18 land—a gift from William and Elizabeth Thacher Kent. The proclamation of Muir Woods
19 as a national monument helped spur conservation efforts elsewhere, notably protection of
20 resources not under federal ownership. During the four decades following its
21 establishment, Muir Woods National Monument—the first national monument located in
22 close proximity to a major city—gained national and international renown as a place that
23 expressed the ideals of American conservation. This perception culminated historically in
24 a ceremony held on May 19, 1945, by the United Nations Conference on International
25 Organization in memory of President Franklin D. Roosevelt. During the service in
26 Cathedral Grove, speakers often referred to the spiritual quality of the site, thus attesting
27 to the power of Muir Woods to function as a transcendent sacred space.

28 Muir Woods is also significant in the area of conservation for its association with early
29 conservation achievements in the San Francisco Bay Area. It was the first public park
30 established in an extensive conservation district that today extends along much of the
31 western Marin Peninsula, directly across the Golden Gate from the City of San Francisco.
32 This area is administered at the federal, state, and local levels by Golden Gate National
33 Recreation Area, Mount Tamalpais State Park, Marin Municipal Water District, and
34 Marin County Open Space District, an administrative structure that traces its origins back
35 to the management structure William Kent established for Muir Woods and the adjoining
36 lands under his ownership.

37 In addition to its primary significance in the area of conservation, the buildings and major
38 structures at Muir Woods National Monument, dating from 1922 to 1940, are also
39 significant in the area of architecture as representative examples of pre-World War II
40 vernacular rustic architectural and engineering design in the National Park Service.
41 Designed by well-known National Park Service architects and landscape architects and
42 built in part through New Deal-era federal work-relief programs including the Civilian
43 Conservation Corps (CCC), the buildings and structures at the monument reflect the

1 system-wide effort to advocate a high degree of craftsmanship and use native materials to
2 help harmonize built features with the national monument’s forested natural landscape.

3 In 2008, a 425-acre Muir Woods National Monument Historic District was listed in the
4 national register of Historic Places. The historic district includes the 295-acres within the
5 original national monument boundaries plus additions of 130 acres before 1940. The
6 historic district includes the buildings which compose the administrative and maintenance
7 area adjacent to the south or main entrance to the monument, certain trails and roads and
8 their associated landscape structures that fan out from this headquarters to the south and,
9 mainly northwest, and four memorial plaques that have significance in the monument.

10 The subject buildings and structures were built during the first 32 years of Muir Woods
11 National Monument’s existence. The oldest building is the Superintendent’s Residence, a
12 constructed in 1920 building with 1930s additions, while the Superintendent’s Garage
13 and Equipment shed were built in the 1930s by the CCC. The CCC also constructed a
14 series of creek revetments (riprap) and rehabilitated a number of trails, including the Ben
15 Johnson Trail and the Hillside Nature Trail.

16

VISITOR USE AND EXPERIENCE—GOLDEN GATE NATIONAL RECREATION AREA

3 *“These are the places I go when...urban life becomes too stressful. To be able to walk*
4 *in these beautiful places; to watch the birds, hang gliders, surfers, children at play, and*
5 *fishermen is a balm to the soul.” – Golden Gate National Recreation Area visitor*
6 **during public scoping**

7 Golden Gate National Recreation Area lands, which stand in sharp contrast to the nearby
8 metropolitan areas, span three Bay Area counties and afford visitors outstanding
9 recreational opportunities. Residents and visitors alike value the “wilderness next door,”
10 an appropriate description for the 75,000 acres of land and water that abut the highly
11 developed areas of Marin, San Francisco, and San Mateo counties. Astounding scenic
12 views, diverse recreational opportunities, and educational experiences coexist within the
13 national recreation area, making it a place for all ages.

14

15 **DIVERSITY OF RECREATIONAL OPPORTUNITIES AND NATIONAL** 16 **PARK EXPERIENCES**

17 The wide-open spaces preserved here are a dramatic contrast to the surrounding city
18 environment. Visitors to the park have expressed enjoyment in the open space and clean
19 air; quiet and solitude; and the ability to commune with nature, slow down, and relax.
20 Activities such as walking along a quiet beach, discovering a deserted coastal
21 fortification, and watching a hawk soar high overhead become spiritual experiences for
22 many. These places, where city, nature, and history are mixed together in breathtaking
23 beauty, call deeply to the psyche of urban dwellers.

24 The spectacular setting of ocean, windswept coastal headlands, Alcatraz and Angel
25 Islands, and the iconic Golden Gate Bridge has afforded the City of San Francisco
26 international recognition as one of the world’s most beautiful cities. The Golden Gate
27 National Recreation Area serves as the panoramic backdrop to the Bay Area. Some of the
28 most scenic views in the region are of the ocean and bay from lands within the national
29 recreation area. Views of the Golden Gate Bridge, Alcatraz Island, and the Marin
30 Headlands from sites in San Francisco County have been captured in countless
31 photographs. Conversely, the Marin Headlands offer dramatic views of the San Francisco
32 Bay and the City of San Francisco. Another important viewshed in the park is the view of
33 Marin County park lands in the darkness. These lands are undeveloped; from San
34 Francisco, they appear truly dark and wild, especially in comparison to the city lights on
35 the peninsula. During scoping for this plan, the public expressed significant appreciation
36 for the scenic qualities of the park, and concern about the long-term protection of the
37 park’s scenic integrity.

38 Viewing nature is another popular activity for visitors. Raptors can be spotted from the
39 headlands and shorebirds can be viewed from Ocean Beach and other areas. The national
40 recreation area has an abundance of open space land populated with 1,200 plant and
41 animal species. The area has been designated a biosphere reserve due to the diversity of

1 its natural habitat. Visitors have strongly expressed a belief that the unique fauna and
2 flora should be protected, and some have noted their concern regarding increasing
3 impacts to resources resulting from visitor activities.

4 Learning about the area's history is also an important aspect of the visitor experience at
5 Golden Gate National Recreation Area. Coastal defense posts are a major reason the park
6 is preserved today. Fortifications date from Spanish settlement in 1776 through the 20th
7 century. Signs of the military history are scattered throughout the park lands. The forts
8 (including Mason, Cronkite, Barry, and Funston) offer interpretation of the structures and
9 strategies used to defend the Bay Area. Milagra Ridge holds the remnants of a post-
10 World War II battery and a Nike missile site. The Nike Missile Site in Marin Headlands
11 has guided tours available for those interested in Cold War-era fortifications. Other
12 Interpretive exhibits and programs offered by both park staff and park partners give
13 visitors an opportunity to learn about the diverse and extensive history of the area.

14 Beaches play an important role in recreational activities available to visitors in the
15 national recreation area. Over 25% of surveyed visitors to the park lands in southwestern
16 Marin County went to the beach (Godbe Research and Analysis 2002). Stinson, Rodeo,
17 and Muir beaches in Marin County and Ocean Beach and China Beach in the City of San
18 Francisco provide places for visitors to walk, jog, sunbathe, swim, surf, fish, play
19 volleyball, and picnic. Visitation to these areas is highly weather dependent; heaviest use
20 occurs during the summer months (Godbe Research and Analysis, 2002).

21 Trails are the heart and soul of the national recreation area. Trails are places where people
22 can connect to the area's natural and historic treasures. With 196 miles of trails that range
23 from paved surfaces to single-track dirt paths, much of Golden Gate National Recreation
24 Area is a walkers' and hikers' paradise. Multi-use trails also serve mountain bikers and
25 equestrians. The new park lands in San Mateo County expand the national recreation
26 area's already extensive trail networks and related recreation opportunities. The public
27 has expressed their strong support for the diversity of trail opportunities provided in the
28 park. They also have noted how much they enjoy the diversity of natural landscapes,
29 historic sites, wildlife, and native plants that are visible along the trails. Some visitors,
30 however, are concerned about conflicts between some trail uses, particularly safety
31 concerns between bicyclists and equestrians. In addition, some of the public is concerned
32 that certain trail activities, such as dog walking, horseback riding, and mountain biking,
33 might be more restricted in the future. A desire to increasing the number of trails that
34 meet the Americans with Disabilities Act requirements was also mentioned during
35 scoping for this plan.

36 Overnight facilities exist within the park, including hostels at Fort Mason, Montara
37 Lighthouse, and the Headlands, and camping areas in Marin County and at Phleger Estate
38 in San Mateo County. Overnight accommodations allow visitors to explore a trail or area
39 more extensively than would be possible in a day trip. Overnight areas can also serve as
40 hubs for activities, such as at Fort Mason, where visitors can explore the greater area
41 from a convenient location.

42 The park and its partners offer many opportunities to get involved in stewardship of the
43 park. In 2007, the Golden Gate Conservancy brought 13,600 volunteers to the park for
44 activities such as trail building, habitat restoration and conservation, and organized youth

1 programs in the park (Golden Gate National Parks Conservancy 2007). Stewardship
2 activities bring in thousands of school-aged children to the park, allowing all who
3 participate to forge a deeper connection with park lands and the resources within those
4 lands. Environmental education programs exist through partners at several sites,
5 including Slide Ranch and Fort Cronkite. The Golden Gate Conservancy was created for
6 the preservation and enhancement of park lands. The Conservancy works to improve the
7 experience for park visitors, and to build a community of people dedicated to the parks.
8 These mutually beneficial relationships between the park, its partners, and park visitors,
9 allow the park lands to thrive at a level much higher than could be accomplished through
10 federal funding alone.

11

12 **VISITOR OPPORTUNITIES AT ALCATRAZ ISLAND**

13 Alcatraz Island sits in a highly visible location in the San Francisco Bay and is a major
14 visitor attraction within the Golden Gate National Recreation Area, with a significant
15 demand for visitation. Although it has been used for a variety of purposes over the years,
16 it is best known for its service as a federal prison from 1934-1963. The island was opened
17 to the public in 1973 and has become a popular tourist destination. The National Park
18 Service and its partners offer visitors extensive interpretation of the federal penitentiary
19 period of the island, as well as the military prison and Indian self-determination
20 movement. In addition, the ferry trip over to the island and many locations on the island
21 offer great scenic viewing of the Golden Gate Bridge, the Pacific Ocean, San Francisco
22 Bay, the City of San Francisco, and the Marin Headlands. Further, learning about the
23 island's role in the ecological system of the Bay, including its contribution as important
24 migratory bird habitat, is another highlight of a visit to to island. Alcatraz Island also
25 offers overnight experiences a few times a year through special organized events.

26

27 **VISITOR USE AND CHARACTERISTICS**

28 The 75,000 acres of Golden Gate National Recreation Area lands and waters serve over
29 15 million visitors a year, making Golden Gate National Recreation Area one of the
30 largest urban parks in the world (citation). Extending 80 miles from north to south, the
31 various sites of Golden Gate National Recreation Area form an expansive public green
32 space for both the local urban population and tourists to enjoy.

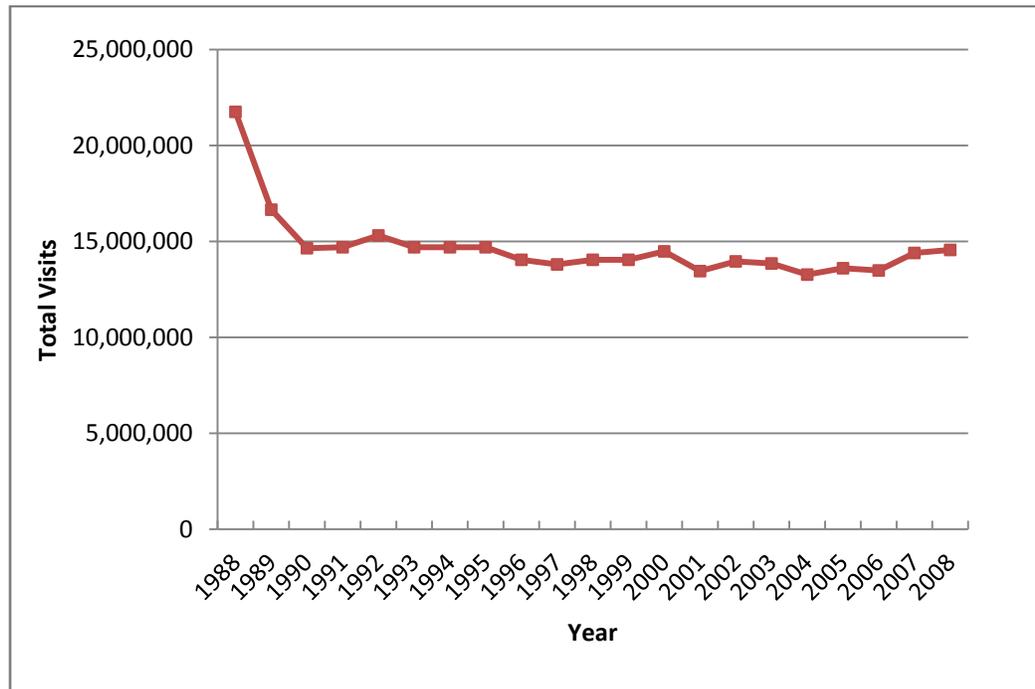
33 In 1972, the first year that Golden Gate National Recreation Area was established, the
34 park had over 42,000 visitors. There have been substantial increases, and a few
35 intermittent decreases since then, but annual visitation has remained level over the last
36 twenty years at around 15 million visitors (see figure 10) (National Park Service 2008).

37 The national recreation area receives about 5% of the total visitation to national parks
38 across the nation, ranking it as the second most visited park in the park system (National
39 Park Service 2008). Many of the sites within Golden Gate National Recreation Area are
40 located in the “backyard” of Bay Area residents who use the park lands for recreation and
41 exercise. Thus, at many of the park sites, visitors from the local area account for the
42 majority of visitors. Other sites, such as Alcatraz Island and the park lands of the Marin

1 Headlands, are major tourist destinations, receiving visitors from across the nation and
 2 around the world. Visitor use levels remain relatively stable to Golden Gate National
 3 Recreation Area throughout the year, given the area’s temperate climate and year-round
 4 attractions and support services. However, the park does experience slightly higher
 5 visitation in the spring and summer, and on holidays (National Park Service 2008). See
 6 figure 11.

7

8 **Figure 7: Golden Gate National Recreation Area Recreational Visitors by Year 1988-2008**



9

10

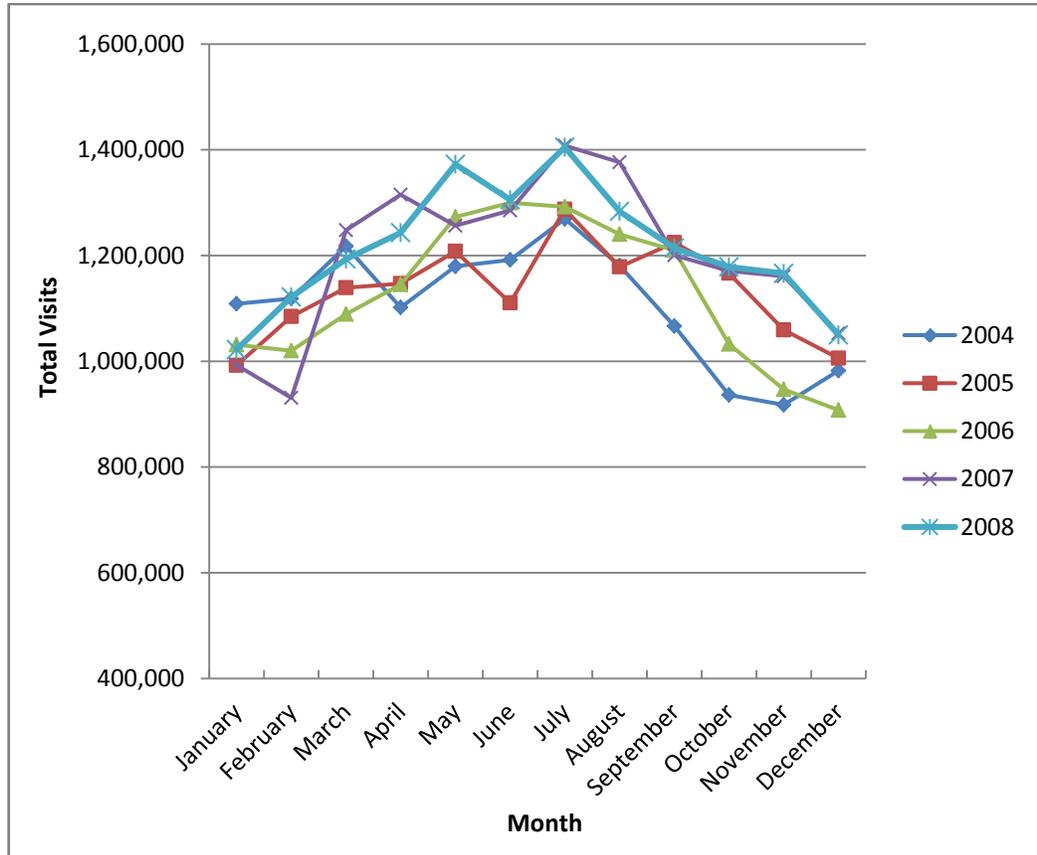
11 The National Park Service and outside organizations have conducted numerous visitor
 12 studies in Golden Gate National Recreation Area in order to provide greater insight into
 13 the current visitor profile in terms of demographics, trip characteristics, and preferences.
 14 Although the visitor populations to the various sites within the national recreation area
 15 often vary significantly, there are several specific characterizations that the majority of
 16 park visitors share.

17 The collection of surveys and studies of park visitors reveal that most arrive in personal
 18 vehicles (Sheffield 2008). Visitors most often come alone or in small groups of up to four
 19 people. Day users are coming to the park to sightsee, hike, walk, spend time with friends
 20 and family, escape, find respite, enjoy nature, and participate in events. A large majority
 21 of visitors come from the local area and enjoy the undeveloped open space that is nearby
 22 and easily accessible. For instance, it was found in a recent study of visitors to the park
 23 lands in San Mateo County that a majority of visitors live close to the park—some within
 24 2 miles—and use the park on a regular basis (Manning 2007). However, at some specific

1 sites, such as Alcatraz Island, studies indicate a much greater mix of local and out-of-
 2 town visitors (Sheffield 2008).

3

4 **Figure 8: Golden Gate National Recreation Area Visitor Use by Month, 2004-2008**



5

6

7 Several visitor surveys of trail users have been completed at Golden Gate National
 8 Recreation Area. The surveys found that trail users come primarily for exercise, rest, and
 9 relaxation, as well as to spend time with friends and family (Sheffield 2008). Some of the
 10 areas surveyed include Point Bonita and the Marin Headlands (2006), Lands End (2005
 11 and 2007), and Mori Point and Sweeney Ridge (2004). Trails are used by both local and
 12 out-of-town visitors, although many users are frequent visitors; up to 75% to 85% are
 13 return visitors. Trail users are generally split evenly between men and women. Also, trail
 14 users are generally between the ages of 20 and 55, well educated, and coming to trails
 15 alone or in pairs (Sheffield 2008).

16

17

1 **Visitors to Alcatraz Island**

2 Over 1 million visitors tour Alcatraz Island each year; this has been holding fairly steady
3 over the recent past (National Park Service 2008). On peak use days, up to 4,400 visitors
4 travel to the island, and up to 5,000 visitors travel there on days when evening programs
5 are offered.

6 Several visitor studies, conducted since 1988, reveal that Alcatraz Island has a distinct
7 visitor profile compared to the rest of Golden Gate National Recreation Area. The island
8 gets far more first time visitors than does the rest of the national recreation area. It also
9 gets a large percentage of nonlocal and international visitors. Nearly 76% of Alcatraz
10 Island visitors are first time visitors and nearly 25% of the visitors are from other
11 countries. Over 70% of visitors surveyed stayed between two and three hours on the
12 island. Over 90% of the visitor groups were visiting with family and friends (Manning et
13 al. 2007).

14

15 **Characteristics of Non-users**

16 While on-site surveys offer information about those who visit specific areas of the park
17 and use the park’s recreational resources, such surveys do not reveal anything about those
18 who are not visiting the park. Many of the diverse groups living in the San Francisco Bay
19 Area have not traditionally been park visitors. However, some of the factors that have
20 served to keep them from the park have recently been studied. Some of these barriers
21 include lack of public transportation, language differences, lack of access to information,
22 equipment costs, and lack of time. Other barriers include a minimal representation of
23 ethnicity and race in the park staff and perceived prejudice. Lack of knowledge,
24 experience, and awareness of where to go, what to do, and the skills needed to partake in
25 activities were additional factors in not visiting (Roberts 2007; Winter, Jeong, and
26 Godbey 2004).

27 Although some of these groups visit the park infrequently, their desired outcomes for
28 park visits are much the same as those of more frequent visitors. In Roberts’ study (2007)
29 of ethnic minorities and visitation constraints, participants expressed a range of
30 preferences for recreational activities (indoor and outdoor). All groups in the study
31 expressed a clear desire to enjoy the numerous benefits associated with outdoor
32 recreation, along with an interest in education about national parks. Cultural connections
33 to nature and the natural environment ranged from mental and physical benefits to
34 spiritual and religious gains in personal life. Participants identified the benefits of parks
35 in relation to nature being healthy, with a typical emphasis on mental health (parks as
36 reducing stress or strains of everyday life) and in reference to increasing their connection
37 to “God or spirituality” (Roberts 2007).

38

39 **VISITOR UNDERSTANDING, EDUCATION, AND INTERPRETATION**

40 Golden Gate National Recreation Area offers unique and varied experiences to visitors
41 through the interpretation, education, and stewardship programs offered by the park and
42 park partners. Interpretation is delivered through a variety of media and at a variety of

1 locations. Opportunities to learn range from self-discovery to formal educational
2 programs, and these opportunities appeal to a variety of people and learning styles.

3 Participation in interpretation programs helps visitors to form their own intellectual and
4 emotional connections with the meanings and significance of the national recreation
5 area's resources. The park interprets its resources by several methods, including visitor
6 center exhibits, audio tours at Alcatraz Island, ranger talks, educational brochures, and
7 waysides. Visitor and park information centers are located in Fort Mason, Marin
8 Headlands, Pacifica, the Cliff House, and Crissy Field. According to the 2008 *Golden
9 Gate National Recreation Area Visitor Survey Card Data Report*, the park is meeting
10 visitor needs, and excelling in categories such as visitor centers and sightseeing facilities
11 (National Park Service 2008b). It was frequently noted during this planning process that
12 the public places a high value on the educational and stewardship programs offered at the
13 park and would like to see those opportunities maintained and even expanded. The public
14 expressed specific interest in having more signs, maps, and interpretive programs
15 available. Another request was for more opportunities to learn of the American Indian
16 stories related to the park.

17 Partners of the Golden Gate National Recreation Area are vital to the success of the
18 park's efforts at promoting visitor understanding, education, and interpretation. A wide
19 range of enthusiastic and committed partners operate within the park lands, offering
20 visitor opportunities such as environmental education, live performance, art appreciation,
21 children's programs, equestrian programs, marine mammal conservation, agricultural
22 education, and conservation of the parks. Partners operate park bookstores, hostels, and
23 other facilities that offer visitor-related services on park lands, thus enhancing and
24 deepening visitor experiences and creating a community of park stewards. Partners also
25 fund interpretation and volunteer efforts, as well as capital construction projects such as
26 visitor centers. Their advocacy is integral to engaging people in the parks, and facilitating
27 visitors' understanding of park stories and resources.

28

29 **SAFE AND ENJOYABLE ACCESS AND CIRCULATION TO AND**
30 **WITHIN THE PARK (SEE ALSO TRANSPORTATION SECTION)**

31 Safe and enjoyable transportation to and within the park lands is important to the visitor
32 experience at Golden Gate National Recreation Area. Currently, the majority of visitors
33 arrive by personal vehicle. This sometimes causes congestion problems along roadways,
34 in parking areas, and in nearby neighborhoods. Because public transportation connections
35 to the park are limited, the large population of area residents without personal vehicles
36 cannot easily travel to the park. Although there is an extensive public transportation
37 system that serves the City of San Francisco, connections often stop short of the national
38 recreation area, or serve the national recreation area only on weekends and holidays.
39 Further, the park road systems were created for vehicular rather than bicycle circulation.
40 This lack of public transit or bicycle access can cause frustration to visitors. In the 2007
41 study by Roberts, the lack of public transportation was identified as a barrier to attracting
42 ethnic minorities to the park.

1 Some areas of the park, like those in Marin County, have narrow winding roads that offer
2 few opportunities for passing another vehicle. Some roads are not ideal for multiple
3 modes of transportation, which can put bicyclists and pedestrians at risk. Additionally, at
4 Stinson Beach, congestion on peak days causes long waits to enter and exit the area.
5 Visitors also commented that Mori Point and Sweeney Ridge are not accessible for
6 persons with disabilities.

7 While the park faces challenges regarding access, many positives also exist. Within the
8 Golden Gate National Recreation Area are miles of trails, making it possible for hikers,
9 bikers, and equestrians to travel great distances through park lands. The Trails Forever
10 Program was launched in 2003 to build a world-class system of trails, which has been
11 vital to the improvement of trails within the Golden Gate National Recreation Area.
12 Public scoping comments sometimes focused on the need for trail design improvements
13 to make the trails safer for multi-modal use, and the need for loop trails. Trails in all areas
14 of the park lands could be improved to connect to neighborhoods, nearby public lands,
15 and the regional trail network.

16 The embarkation pier to Alcatraz Island is accessible by public transportation. However,
17 once on the island, visitors must walk up steep roads to get to the cell house and other
18 attractions. There is a trolley available for visitors who might need assistance, but the
19 road is narrow and steep, with few turn around points or pull-off areas. Although very
20 few incidents have occurred, conflicts between visitors and vehicles are a great concern
21 to park staff.

22 The Transportation Section of this document goes into further detail about the intricacies
23 of the transportation environment to and within Golden Gate National Recreation Area.

24

25 **VISITOR SAFETY**

26 Golden Gate National Recreation Area experiences the traditional safety issues found in
27 any national park, but also faces additional visitor safety challenges due to its urban
28 location. The national recreation area staff make considerable effort to provide safety
29 information in easily accessible locations and formats. However, there are many points of
30 entry to the park, and visitors are sometimes unaware and unprepared for dangers.

31 Urban challenges include criminal activity, crowding, and congestion that affect the
32 ability of law enforcement to respond in a timely manner. Additionally, as visitors to the
33 park are moving from urban areas to undeveloped open space, they may fail to bring
34 adequate food and water, become lost in unknown areas, or get into a situation too
35 difficult for their skill or experience level. The Point Bonita and Marin Headlands visitor
36 survey identified a lack of trail signs that makes it difficult to stay on the correct trail
37 (Tierney 2007). At Mori Point and Sweeney Ridge, visitors identified the lack of good
38 information about the area as a concern (Tierney 2004).

39 The physical features of the land and the natural habitat can also pose safety risks. The
40 national recreation area encompasses ocean and bay waters, which have associated
41 dangers. In much of the Golden Gate National Recreation Area shore areas, rip tides are
42 common and can be dangerous for swimmers. The topography of the area often includes

1 steep and crumbling cliffs that sometimes pose a danger to visitors. Poison Oak, ticks, or
2 mammals such as coyotes or mountain lions could also injure visitors. Off-leash dogs are
3 also a source of fear for some visitors.

4 Conflicts between users can also pose safety problems, such as those between vehicles
5 and pedestrians, or between equestrians and bicyclists. During public scoping, people
6 expressed concern that some trails were not designed appropriately to help users avoid
7 conflicts.

8 Road safety is also a component of visitor safety. Access to and from Highway 1 poses a
9 problem at several points in the Golden Gate National Recreation Area, such as at
10 Montara Lighthouse. In some areas, closed or unmaintained facilities may pose risks to
11 visitors who explore them. In particular, Alcatraz Island has a number of buildings in
12 very poor condition that can pose safety hazards to visitors. At times, areas have been
13 closed off due to cracking or crumbling of buildings.

14 A law enforcement presence is not well distributed throughout the park lands. In
15 particular, there is less of a presence in San Mateo and Marin counties, and as a result,
16 response time to incidences is longer in those areas.

17

VISITOR USE AND EXPERIENCE – MUIR WOODS NATIONAL MONUMENT

3 ***“Time stands still in Muir Woods.” – Visitor to Muir Woods***

4 Surrounded by the tallest living vegetation in the world, visitors to Muir Woods
5 experience a majestic and awesome setting. Ranging in age from 400 to 800 years, these
6 redwoods serve as a reminder of the forests that once populated the hills surrounding the
7 San Francisco Bay. These majestic giants, in combination with Redwood Creek, cannot
8 help but awe visitors and take them to a more serene place and time. This world famous
9 stand of redwoods also played a key role in the United States conservation movement.

10

11 **DIVERSITY OF RECREATIONAL OPPORTUNITIES AND NATIONAL** 12 **PARK EXPERIENCES**

13 Muir Woods National Monument offers outstanding opportunities for walking and hiking
14 among the giant redwoods. There are six miles of trails within the monument, including
15 three loop trails. One and a half miles of trail are paved surface or boardwalk, thus
16 providing greater access to the forest. Other more challenging trails extend out of the
17 monument and connect to nearby public lands such as Mount Tamalpais State Park and
18 Muir Beach.

19 Members of the public complimented the area on its great hiking, although others
20 mentioned the need for better hiking information. Other opportunities for visitors include
21 self-guided walking tours, ranger led talks and tours, volunteer activities, and educational
22 and restoration programs.

23 In visitor surveys at the monument, people identified the trees, beauty, peacefulness,
24 trails, and other aspects of the natural surrounding as the features they most enjoyed. One
25 visitor commented on the special ability to commune with nature while at the monument.
26 Some visitors expressed their dislike for the crowds, noise from groups, lack of parking,
27 and closed trails. Crowding issues primarily occur at peak times in the monument,
28 especially on weekends and holidays in the summer. While most visitors had no
29 suggestions for improvement, some visitors mentioned that more information and
30 interpretation, more trails, and more parking would be appreciated (Manning et al. n.d.).

31 The natural soundscape at Muir Woods National Monument is a highly valued part of the
32 visitor experience. Some members of the public complained about the noise from other
33 visitors, particularly noise from large groups. The monument has recently implemented
34 “quiet days” and “quiet zones” to encourage visitors to voluntarily modify their behavior
35 to enhance the contemplative feeling of the monument’s natural setting.

36

37 **VISITOR USE AND CHARACTERISTICS**

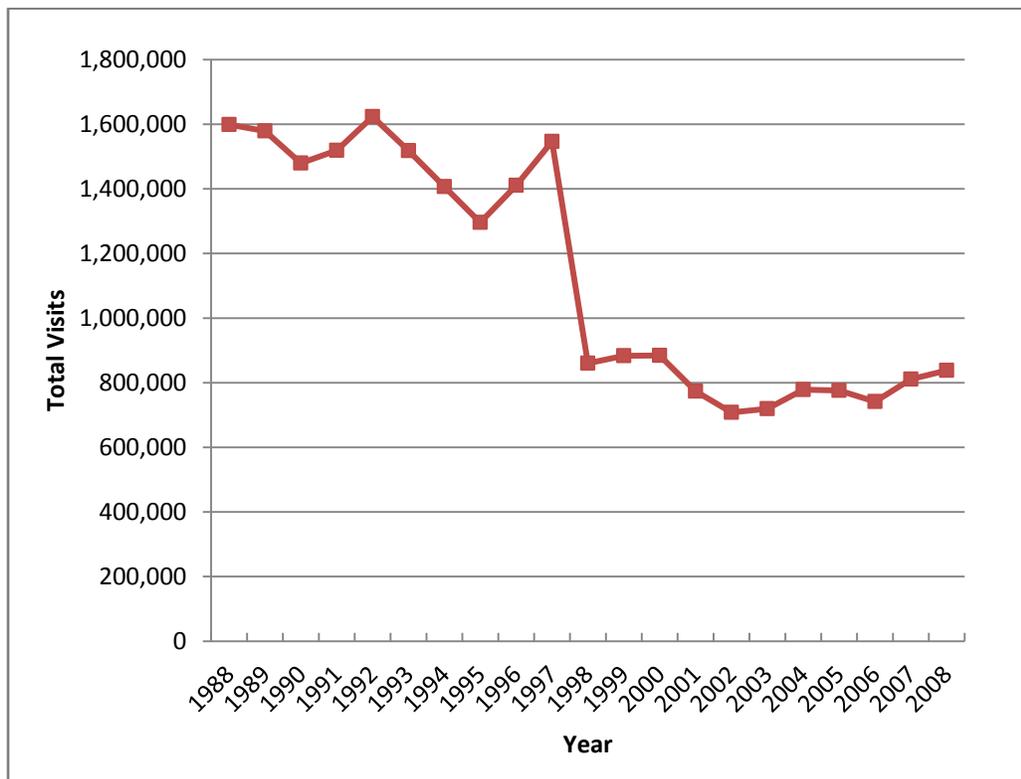
38 While annual visitation to Muir Woods National Monument peaked in the late 1990s at
39 about 1.6 million visitors, it has since stabilized over the last ten years at around 750,000

1 (see Figure 12). Monthly visitation varies significantly, with the summer months
 2 attracting the highest number of visitors. This is likely due to the greater numbers of out-
 3 of-town visitors, who often travel during the summer (see figure 13) (National Park
 4 Service, 2008). Local residents may also visit Muir Woods more often in the summer
 5 when children are out of school.

6 Muir Woods National Monument, like Alcatraz Island, has been the focus of many visitor
 7 surveys. Studies conducted between 2003 and 2005 provide good demographic
 8 information on visitors (Manning et al. n.d.). For example, 72% of visiting groups are
 9 families with the majority of groups consisting of 2-4 people. Over half of the survey
 10 respondents were first-time visitors, suggesting that Muir Woods is an important urban
 11 gateway to the national park experience. Ninety-two percent of visitors were from the
 12 United States, with almost 40% of domestic visitors residing in California. The
 13 educational attainment of visitors was very high; about 80% of all visitors had a post-
 14 secondary degree. Most visitors were there for less than four hours (Manning et al. n.d.).

15

16 **Figure 9: Muir Woods National Monument Recreation Visitors by Year, 1988-2008**



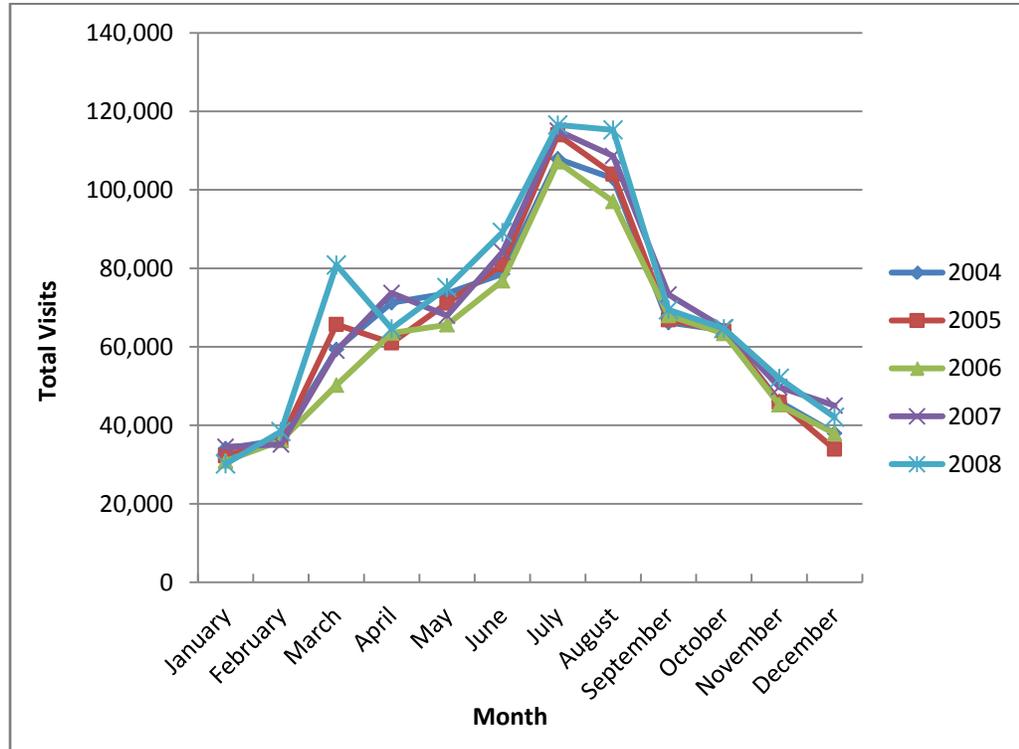
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1 **Figure 10: Muir Woods National Monument Visitor Use by Month, 2004-2009**



2

3

4 **VISITOR UNDERSTANDING, EDUCATION, AND INTERPRETATION**

5 The stories of Muir Woods are many: the ecology of the area including watershed
 6 ecology, the natural life of the redwood forest, the history of the conservation movement,
 7 the story of the biosphere reserve, and the many multicultural stories related to the area.
 8 Muir Woods National Monument offers a visitor center with exhibits and information, a
 9 self-guiding walk, ranger talks and tours, evening programs, and a junior ranger program
 10 among its educational program offerings.

11 “Parks as Classrooms” is a program that links the monument to school curricula. This
 12 program is accomplished with the assistance of park partners, including the Golden Gate
 13 National Parks Conservancy, the Presidio Trust, and educators. The monument staff
 14 collaborate with other local organizations that offer learning and educational programs,
 15 thus expanding the interpretive and educational offerings available to visitors.

16 In public scoping for this plan, some people commented that they particularly appreciate
 17 the messages associated with the preservation values of the monument and its connection
 18 to conservation history. A few others noted that additional information and signage at
 19 Muir Woods National Monument would be desirable to enhance knowledge about the
 20 ecosystem processes.

1 **SAFE AND ENJOYABLE ACCESS AND CIRCULATION TO AND**
2 **WITHIN THE PARK (SEE ALSO TRANSPORTATION SECTION)**

3 For many visitors, traveling to Muir Woods National Monument at peak times can be a
4 frustrating experience. The parking lot fills up quickly, and often people resort to parking
5 along the road. For example, during the 2003 visitor study, researchers found that 92% of
6 visitors arrived by car, and of those, 76% were able to park in parking lots, with the
7 remainder having to park along the road (Manning et al. n.d.).

8 It is likely that some visitors who drove to the monument may have left when faced with
9 no easily accessed parking options. Public transportation via shuttle is now available on
10 weekends and holidays in the summer, but at other times, there is no public transportation
11 service to the monument. The shuttle system, implemented in 2004 to help ease the
12 parking limitations at the monument, has improved access for visitors. Once within the
13 monument, visitor access is by walking and hiking on trails. The monument has three
14 loop trails, and 1.5 miles of accessible paved or boardwalk trail. There is also trail access
15 from nearby public lands, including Mount Tamalpais State Park and Muir Beach.

16

17 **VISITOR SAFETY**

18 The monument is a relatively small area, but that does not mean it is free from danger.
19 Getting lost on the trails that link to other public lands is one potential issue. Other safety
20 concerns include the presence of poisonous plants, small animals, and insects.

21 A safety concern mentioned by members of the public relates to access to the monument.
22 The road to Muir Woods National Monument is narrow, winding, and steep in parts.
23 Comments indicated that larger vehicles do not always stay in their lanes on the curves,
24 causing danger to oncoming traffic, including vehicles and bicycles. In addition, roadside
25 parking at the monument results in real and perceived safety dangers for visitors who
26 must traverse the road to gain access to the monument's entrance.

27

SOCIAL AND ECONOMIC ENVIRONMENT OF THE PLANNING AREA (INCLUDING BOTH GOLDEN GATE NATIONAL RECREATION AREA AND MUIR WOODS NATIONAL MONUMENT)

5

6 INTRODUCTION

7 The social and economic conditions of the Bay Area and the gateway counties of Marin,
8 San Francisco, and San Mateo influence Golden Gate National Recreation Area and Muir
9 Woods National Monument (collectively referred to as Golden Gate National Recreation
10 Area in this section) and how they are managed. Conversely, Golden Gate National
11 Recreation Area directly contributes to the social and economic conditions of these three
12 counties and the Bay Area as a whole. This section describes the existing conditions
13 related to this relationship by highlighting the park’s quality of life benefits as well as the
14 Bay Area’s demographic and economic trends.

15 The San Francisco Bay Area is not only one of the most diverse metropolitan areas in the
16 United States, it also has a unique culture and community ethic that distinguishes itself
17 from most other American urban centers. Generally speaking, the Bay Area’s cultural
18 identity exhibits an intrinsic sense of awareness, stewardship, and activism toward social
19 and environmental issues.. With such a large segment of the Bay Area community being
20 supportive of environmental stewardship and societal health, an inherent community
21 “energy” exists right at the park’s doorstep to support and improve Golden Gate National
22 Recreation Area for years to come.

23 This section summarizes the existing social and economic conditions in the Bay Area, as
24 well as in the three counties most affected by Golden Gate National Recreation Area
25 (Marin, San Francisco, and San Mateo). The section also includes projections of how
26 some of these conditions may change over the next 20 years, which is the planning
27 horizon of the park’s general management plan. To maintain consistency with regional
28 demographic analyses, the term “Bay Area” in this section will refer to the nine-county
29 region defined by the Association of Bay Area Governments (ABAG). The nine counties
30 of the Bay Area include Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo,
31 Santa Clara, Solano, and Sonoma.

32

33 THE IMPORTANCE OF PARKS TO A COMMUNITY

34 Park and open space areas in and around an urban area are a key attribute to the quality of
35 life in the community. This importance becomes even more significant in very large
36 metropolitan areas, where population densities and the travel distance to open, public
37 lands are greater. Golden Gate National Recreation Area is no exception, as the San
38 Francisco Bay Area is the fifth largest metropolitan area in the United States. Thus,
39 Golden Gate National Recreation Area plays a vital role in sustaining and enhancing the
40 quality of life for the residents of the Bay Area. The significance of this role becomes

1 more evident when we consider the following four specific ways parks and open space
2 contribute to quality of life.

3

4 **“Woven into the Fabric” of the Bay Area**

5 In a literal sense, the size, geographic orientation, and location of Golden Gate National
6 Recreation Area within the Bay Area make the park a large physical component of this
7 metropolitan area. The public lands of the Golden Gate National Recreation Area serve as
8 a natural and scenic backdrop to the urban landscape of the Bay Area by day and an open
9 expanse of darkness by night. In addition, the park’s close proximity to the urban centers
10 of the Bay Area elevates its importance. However, equally important and in a more
11 figurative sense, Golden Gate National Recreation Area is “*woven into the fabric*” of the
12 Bay Area community. The park is part of the community and the community’s attitude.
13 The themes and aesthetics of the various park components help feed the conservation
14 ethic of the Bay Area community. In turn, this community ethic fuels the residents’
15 valuation and appreciation of the park and its intrinsic natural and cultural resources. This
16 cyclical dynamic helps strengthen the bond between the community and the park and
17 helps sustain a heightened quality of life for the community residents.

18

19 **Community Building**

20 On a related but distinct note, Golden Gate National Recreation Area is one of the many
21 social attributes that helps instill a sense of community in the Bay Area. This community-
22 building effect occurs on two primary levels. First, the many diverse park resources and
23 features help provide a sense of community identity for Bay Area residents. Many of the
24 landmarks, natural wonders, and amenities of Golden Gate National Recreation Area are
25 not only known on a local or state level, but also admired at a national and international
26 level. For example, many people around the U.S. and throughout the world identify with
27 the Bay Area by thinking of the coastal redwoods of Muir Woods National Monument,
28 historic sites such as Alcatraz Island, or even the idyllic views of open lands and water
29 around the San Francisco Bay. This local and global admiration contributes to a sense of
30 identity and pride in being a resident of the Bay Area community. Just as residents may
31 identify with the community via its cultural diversity, culinary quality, free spirit or even
32 49ers or Raiders, they also find a sense of identity with the many attractions of Golden
33 Gate National Recreation Area.

34 Secondly, Golden Gate National Recreation Area can contribute to community-building
35 by providing numerous park sites and open lands for the diverse residents of Bay Area to
36 congregate and socialize. Parks such as Golden Gate National Recreation Area are one of
37 the most effective ways to build a sense of community and enhance quality of life by
38 providing common places for people to interact in a shared environment (Francis 2006).
39 Urban parks are one of the few public places where people of diverse cultures, ethnicities,
40 ages, and lifestyles can congregate and communicate openly in a community. In addition,
41 since cultural and racial diversity is one of the Bay Area’s unique and valuable social
42 attributes, a great opportunity exists for Golden Gate National Recreation Area to reach
43 out and engage nontraditional park visitors.

1 **Health Benefits for Bay Area Residents**

2 In addition to community benefits, Golden Gate National Recreation Area also helps
3 enhance the Bay Area quality of life by improving the psychological and physiological
4 health of the Bay Area residents. A recent report by California State Parks indicates that,
5 “Two-thirds of Californians consider outdoor recreation important to their quality of life”
6 (California State Parks 2005).

7 An urban interface park such as Golden Gate National Recreation Area can help improve
8 the community’s health by offering residents opportunities for personal fitness, active
9 recreation, and other physical exercise. A 2001 Center for Disease Control (CDC) task
10 force report indicates that regular physical activity correlates with a prolonged life
11 expectancy and enhanced health, including a reduced risk for cardiovascular disease,
12 obesity, diabetes, some cancers, and musculoskeletal conditions. But the report also notes
13 that only 25% of U.S. adults report engaging in adequate physical activity. As a result of
14 this shortfall, the CDC task force “strongly recommended” that communities improve
15 access to places that offer physical activity (e.g., hiking and biking trails, parks) (CDC
16 2001). In turn, evidence shows that when people have access to parks, they tend to
17 exercise more. Research also indicates that contact with the natural world improves
18 physical and psychological health (Sherer 2006). Golden Gate National Recreation Area
19 helps satisfy these essential community needs in the Bay Area.

20 In terms of psychological or mental health benefits, regular physical activity can reduce
21 the severity of many mental health disorders, alleviate depression, and decrease stress and
22 anxiety (California State Parks, 2005). Furthermore, even if a park visitor opts for a less-
23 active, more relaxing park experience, an urban park such as Golden Gate National
24 Recreation Area can provide an open and free feeling that helps offset the rather
25 congested or claustrophobic feeling generated by high-density urban living.

26 In addition to the above direct physical and psychological health benefits, Golden Gate
27 National Recreation Area also contributes several other community health benefits for
28 Bay Area residents. For example, the numerous attractions and open areas of Golden
29 Gate National Recreation Area offer a place for children to stay active, safe, and socially
30 engaged (as opposed to being sedentary in front of a TV or video game, or getting into
31 trouble). A community that offers a healthy environment for children reaps numerous
32 social benefits in the short- and long-term since the kids have ample opportunities to
33 learn, socialize, exercise, and get “hands-on” exposure to the natural world around them.
34 During the comment period for the preliminary general management plan alternatives,
35 many children themselves submitted letters that expressed the importance of various park
36 features to them. Comments such as “It teaches kids how to love nature” and “kids learn
37 and discover lots of cool stuff” were plentiful.

38

39 **The Increasing Value of Golden Gate National Recreation Area**

40 A fourth contributor to the Bay Area’s quality of life relates to how the community value
41 of Golden Gate National Recreation Area’s open spaces increases over time as population
42 growth and urban sprawl continue in the region. As of 2007, the Bay Area had a
43 population of roughly seven million. By 2035, the Association of Bay Area Governments
44 (ABAG) projects that the population of this nine-county region will grow by two million

1 people (ABAG 2007). With this population growth looming on the horizon, housing
2 production will need to increase as well. In recent decades, a significant amount of Bay
3 Area housing growth sprawled out to the fringes of the Bay Area to accommodate the
4 population growth. This fringe development resulted in an expanded urban area and a
5 decrease in open and agricultural land in the Bay Area. This trend will likely continue
6 over the next 20 years, along with additional infill development in existing urban areas.
7 As a result, the anticipated population and housing growth in the future will displace a
8 significant volume of land that is currently open, undeveloped, or agricultural. Moreover,
9 with every acre of open land that is displaced by urban development, the community
10 value of every acre of existing parkland will increase. Therefore, parks and open space
11 lands like Golden Gate National Recreation Area will become more and more precious to
12 the Bay Area community as the population grows.

13 This “increasing park value” dynamic has other implications that need to be considered in
14 park planning. As Golden Gate National Recreation Area lands become more and more
15 important (and unique) as urban growth continues, pressure will likely mount to allow
16 more nontraditional uses on these parklands. With higher population densities and less
17 available open lands in the Bay Area, both public and private interests may petition for
18 uses such as municipal infrastructure corridors, public parking, or as places for more
19 active and consumptive recreational uses. So, just as parklands may become more
20 precious to the community, they also may become more at risk from demands other than
21 the demand for preservation of open spaces.

22

23 **POPULATION AND COMMUNITY TRENDS**

24 The current and future management of Golden Gate National Recreation Area is directly
25 affected by the population dynamics and composition of the communities that surround
26 it. With the majority of park visitors being Bay Area residents, the visitation and
27 involvement from the local Bay Area communities play an integral role in sustaining the
28 park. As the population grows, there will be an increase in visitor use and demands for
29 Golden Gate National Recreation Area to accommodate traditional and new outdoor
30 recreation opportunities. The following sections summarize the current and projected
31 population and community characteristics of both the Bay Area as a whole and the three
32 gateway counties of the park (Marin, San Francisco, and San Mateo). The narrative will
33 highlight population and community attributes such as population totals, population
34 densities, race, household size, and housing costs.

35

36 **General Description of Overall Bay Area Community**

37 The nine-county Bay Area is generally centered on San Francisco Bay. The urban lands
38 of the Bay Area include 101 cities, with three primary urban centers (San Francisco,
39 Oakland, and San Jose). About half of the projected population increase in the Bay Area
40 over this planning horizon is due to the difference between the number of births and
41 deaths, while the other half is due to expected migration into the area. The primary cause
42 for this in-migration will continue to be the employment opportunities offered by the Bay
43 Area job market (ABAG 2008).

1 **The Population...by the Numbers**

2 The following section highlights the past, current, and projected population figures for
3 the Bay Area, as well as for Marin, San Francisco, and San Mateo counties. The data is
4 drawn from both U.S. Census Bureau as well as research conducted by the (Demographic
5 Research Unit and Economic/Financial Research Unit of the California Department of
6 Finance.

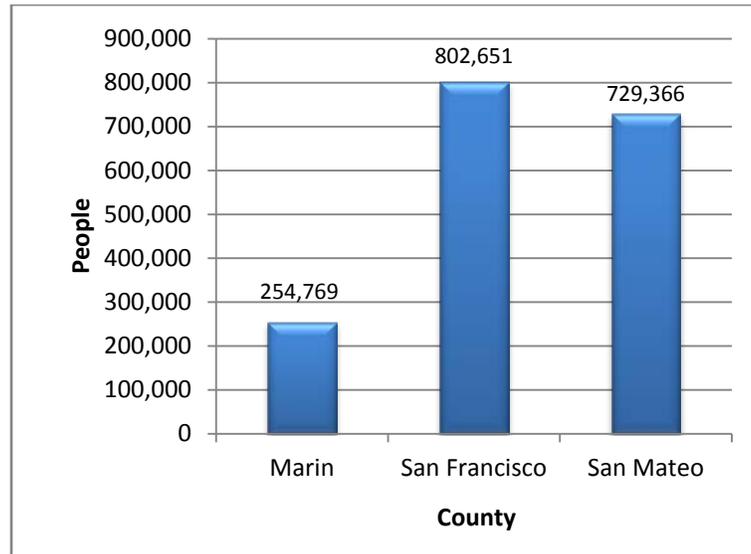
7 The Bay Area population grew steadily from 2,681,332 in 1950 to 6,783,760 in 2000
8 (U.S. Census Bureau, 2009). As of 2006, the Bay Area population estimate was
9 7,167,500. Over the next 20 years, the region's population will continue to grow to a
10 projected 8,709,000 people by 2030, which constitutes nearly an 18% increase. Although
11 the projected population growth is significant, the growth will not be distributed evenly
12 throughout the Bay Area's nine counties. The vast majority of the growth (both
13 numerically and by percentage) will be occurring in the eastern counties of the Bay Area,
14 such as Alameda, Contra Costa, Santa Clara, and Solano counties, where more
15 developable land exists. From 15% to 28% growth can be expected in these eastern areas
16 by 2030. This substantial population growth in the fringe areas of the Bay Area will
17 contribute to future Golden Gate National Recreation Area park visitation numbers.
18 Equally important, given the longer travel distance and more limited transportation
19 options from these eastern areas to Golden Gate National Recreation Area, the park may
20 also experience an overall shift in visitor use patterns from this eastern population base
21 (e.g., duration of stay, preferred park site destinations, number of vehicles in the park).

22 Although the majority of the Bay Area's future population growth is forecasted for these
23 eastern fringe counties, a modest level of infill population growth is also expected in the
24 Golden Gate National Recreation Area gateway counties of Marin, San Francisco, and
25 San Mateo. For example, Marin County had an estimated 2006 population of 254,800.
26 This population is expected to grow 6.7% to about 273,000 by 2030. Meanwhile, the City
27 and County of San Francisco had an estimated 2006 population of 802,600, which is
28 projected to grow 6.1% to 854,700 by 2030. Also, given San Francisco's larger
29 population on its relatively small land area of the peninsula, San Francisco's population
30 density is over 30 times greater than the Bay Area average. Lastly, San Mateo County
31 had an estimated 2006 population of 729,400. San Mateo County is expected to reach a
32 population of about 786,000 by 2030, a 7.2% population growth. Figures 14 and 15
33 capture these conditions and trends in the Golden Gate National Recreation Area gateway
34 counties.

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1 **Figure 11: 2006 Estimated Populations of Golden Gate National Recreation Area Gateway**
2 **Counties**

3



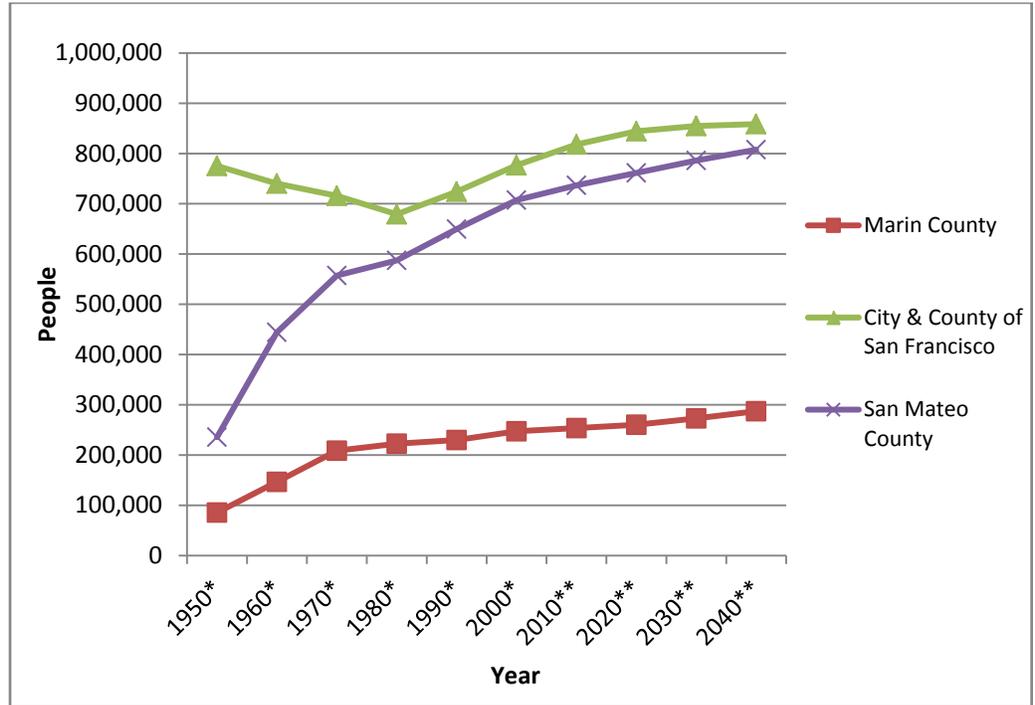
Source: California Department of Finance, Demographic Research Unit and Economic/Financial Research Unit, 2009. <http://www.dof.ca.gov/>

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Cumulatively, these three Golden Gate National Recreation Area gateway counties will account for about 8% of the projected population growth in the overall Bay Area by 2030 (i.e., 8% of the net gain of people in the Bay Area). Given the significant west-to-east shift in the location of population growth within the Bay Area, the three counties of Marin, San Francisco, and San Mateo will become a smaller and smaller component of the overall Bay Area population. In 1970, these three counties accounted for roughly one-third of the total Bay Area population. Over the next few decades, Marin, San Francisco, and San Mateo will account for only about one-fifth of the Bay Area population. Figure 16 highlights this trend. As noted earlier, this geographic shift in the Bay Area population centers over the next 20 years may cause a shift in Golden Gate National Recreation Area visitor use patterns due to the longer distances these eastern Bay Area populations must travel. This possible visitor use trend is particularly significant since the majority of Golden Gate National Recreation Area visitors are from the Bay Area.

1 **Figure 12: Past and Projected Population Growth of the Golden Gate National Recreation**
2 **Area Gateway Counties**

3

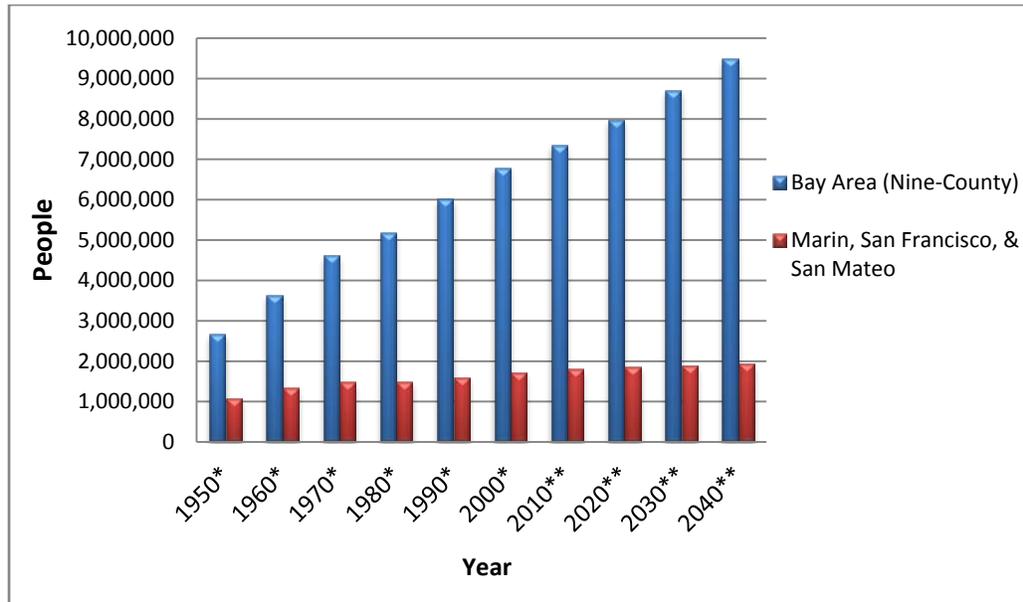


Sources: * U.S. Census Bureau, 2009.; ** California Department of Finance – Demographic Research Unit, 2009.

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1 **Figure 13: Past and Projected Population Growth of Golden Gate National Recreation Area**
 2 **Gateway Counties Relative to Overall Bay Area**

3



4 Sources: * U.S. Census Bureau, 2009.; ** California Department of Finance – Demographic Research Unit, 2009.

5

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9 **The People and the Households**

10 In addition to assessing the status and forecast for overall population growth in the Bay
 11 Area, it is also important to understand the characteristics of Bay Area residents and the
 12 composition of the community's households in planning for the park. This section sheds
 13 light on the community characteristics such as median age, household size, race, income,
 14 poverty levels, and education levels. As in previous sections, these demographic issues
 15 will be discussed for the overall Bay Area as well as the individual Golden Gate National
 Recreation Area gateway counties of Marin, San Francisco, and San Mateo.

16 **Median Age and Household Size**

17 As of 2007, the overall Bay Area had a median age of 37.7 years. Marin, San Francisco,
 18 and San Mateo counties had median ages of 43.8, 39.5, and 39.7, respectively. The
 19 average household size in the Bay Area at that same time was 2.70 people per household.
 20 Marin County and the City and County of San Francisco both had lower average
 21 household occupancies, which were 2.35 and 2.30 people per household, respectively.
 22 San Mateo County's average household size of 2.75 people per household was slightly
 23 higher than the Bay Area average (U.S. Census Bureau 2008).

24 These community characteristics are expected to shift over the next 25 years due to
 25 societal changes, economic conditions, and an aging "Baby Boomer" population. By
 26 2035, the ABAG is anticipating an increase in the Bay Area's median age to 42.5 years.
 27 The expansion of these older age groups will be due to an aging Baby Boomer population

1 and increasing average life spans (ABAG 2007). This is consistent with other projections
2 for the entire state of California, which indicate that the number of senior citizens in
3 California will double by 2020 (Roberts 2007). The Association of Bay Area
4 Governments also anticipates that a larger percentage of this older population segment
5 will be employed than the percentage employed today. In other words, more and more
6 people will likely be working beyond their “retirement years” over the next few decades.
7 With a larger number of older people employed, ABAG predicts that a higher percentage
8 of older people will be living in urban areas, which provide better public transportation
9 opportunities and job opportunities. This trend may eventually place higher demands on
10 public transit systems in the Bay Area, and may perhaps generate a greater need for water
11 transport across San Francisco Bay and other bays in the region.

12 In addition, by 2035, ABAG anticipates that the average household size will decrease due
13 to a percentage increase in one- and two-person households. This projection is based on
14 the likelihood that (1) more young professionals will continue to choose not to have kids
15 or will wait longer to have kids; and (2) kids will be growing up and leaving the existing
16 family households (ABAG 2007).

17 **Race**

18 Racial diversity is one the Bay Area’s unique characteristics. Moreover, from a park
19 management standpoint, understanding the racial make-up of the community can help
20 shed light on ways to increase park visitation, develop better outreach with the
21 community, and improve park program success. In addition, this awareness contributes to
22 improving the quality of life in the community.

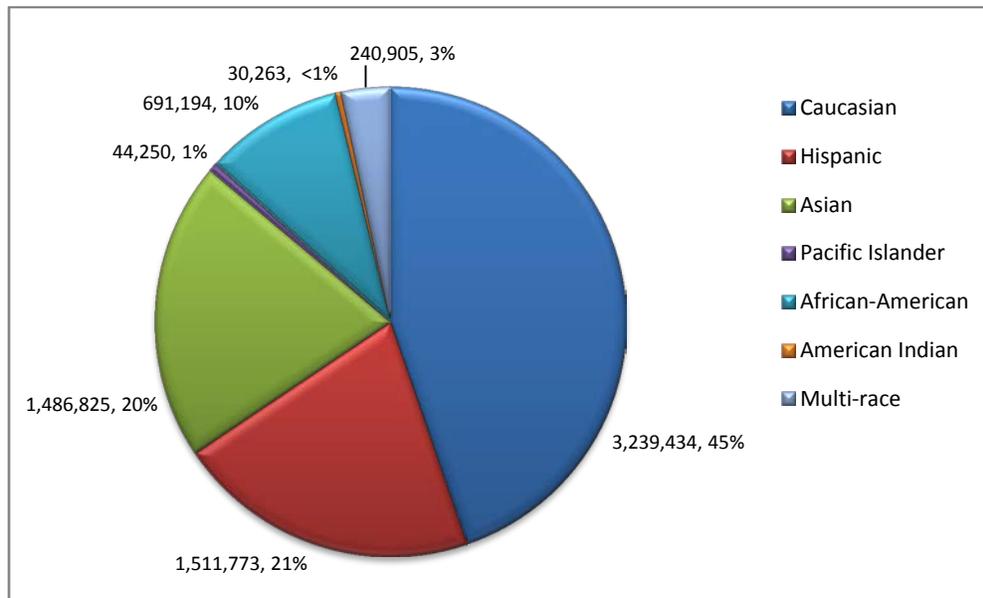
23 As discussed in the Visitor Use and Experience section above, many people from the Bay
24 Area’s diverse racial, ethnic, and cultural groups are not visiting Golden Gate National
25 Recreation Area. A 2007 study of racial and ethnic minority groups conducted by San
26 Francisco State University, in conjunction with the Golden Gate National Parks
27 Conservancy and Golden Gate National Recreation Area, revealed several reasons for
28 this “barrier” to minority visitation to Golden Gate National Recreation Area. Some of
29 the park visitation barriers highlighted in the study included language differences, lack of
30 public transportation, lack of park information (both in specific languages and in
31 general), costs, minimal representation of their race or ethnicity in park staff (can’t
32 identify with staff), and perceived prejudice at the park (Roberts 2007). According to the
33 study, two very evident commonalities across all groups was the desire to enjoy the many
34 physical and psychological benefits of outdoor recreation, and an interest in learning
35 more about national parks.

36 Since the Bay Area population has such a large representation of diverse racial and ethnic
37 groups, it is even more essential for the National Park Service to understand what could
38 attract or hinder people from these groups in visiting Golden Gate National Recreation
39 Area. As of 2007, the nine-county Bay Area community consisted of the following racial
40 percentages: 45% Caucasian, 21% Hispanic, 20% Asian, 10% African American, 3%
41 Multi-race, 1% Pacific Islander, and <1% American Indian (California Department of
42 Finance – Demographic Research Unit 2009). Refer to Figure 17 for a visual
43 interpretation of these data.

1 The racial distribution of each individual county in the region varied considerably in
 2 some cases. For example, when compared to the overall Bay Area, Marin County had a
 3 notably higher percentage of Caucasian residents and a significantly lower percentage of
 4 Asian residents. Marin’s racial composition in 2007 was 74% Caucasian, 17% Hispanic,
 5 4% Asian, 3% African American, 2% Multi-race, <1% American Indian, and <1%
 6 Pacific Islander. Conversely, the City and County of San Francisco had a much higher
 7 percentage of Asian residents and a lower percentage of Hispanic residents than the Bay
 8 Area average (44% Caucasian, 31% Asian, 14% Hispanic, 8% African American, 3%
 9 Multi-race, <1% Pacific Islander, and <1% American Indian). Lastly, the racial
 10 percentages in San Mateo County in 2007 were most consistent with the overall Bay Area
 11 racial composition, with the exception of somewhat higher percentages of Asian and
 12 Hispanic residents and a lower percentage of African Americans (45% Caucasian, 25%
 13 Hispanic, 23% Asian, 3% African American, 3% Multi-race, 1% Pacific Islander, and
 14 <1% American Indian).

15 Consider inserting individual 2007 race pie charts for Marin, SF, and SMat as an
 16 alternative to much of this text.

17
 18 **Figure 14: 2007 Population Estimates in Bay Area, by Race**



Source: California Department of Finance – Demographic Research Unit, 2009.

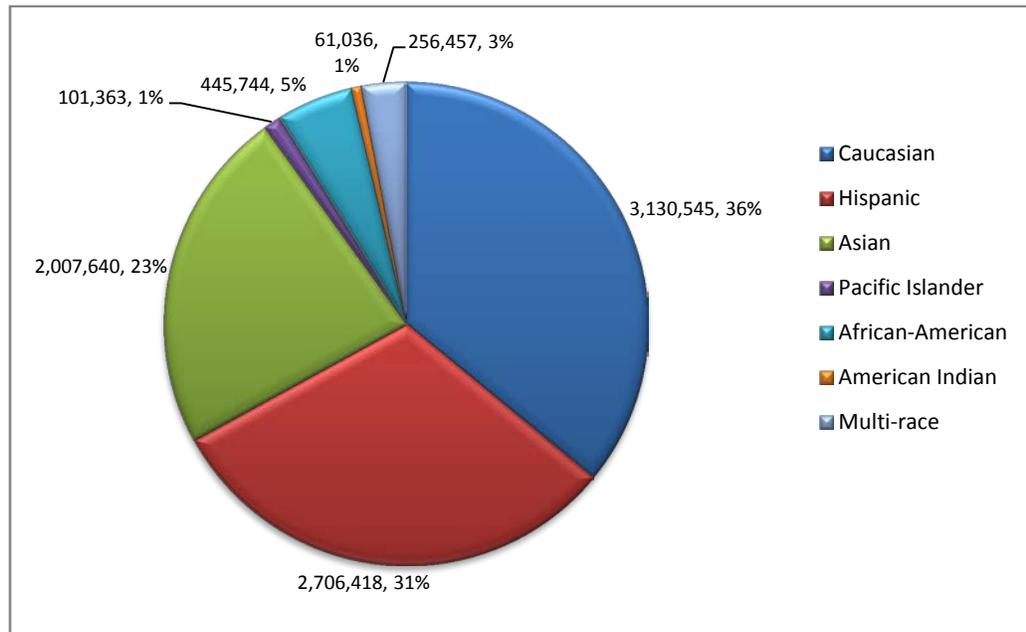
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 23

24 In addition, just like the other community attributes, race percentages in the Bay Area
 25 will be shifting over the next few decades. By 2030, the California Department of
 26 Finance Demographic Research Unit projects that roughly 90% of the overall Bay Area
 27 population will be somewhat evenly divided among Caucasian, Hispanic, and Asian
 28 residents. The 2030 Bay Area racial composition is projected to be 36% Caucasian, 31%

1 Hispanic, 23% Asian, 5% African American, 3% Multi-race, 1% Pacific Islander, and 1%
 2 American Indian. This shift can be seen by comparing figure 17 and figure 18. This
 3 significant increase in the population of various minority racial and ethnic groups over
 4 the next 20 years further emphasizes the importance and need for the National Park
 5 Service to improve outreach and eliminate barriers that might keep people of all races and
 6 ethnic groups from experiencing the park.

7

8 **Figure 15: 2030 Population Estimate in Bay Area, by Race**



9

10 Source: California Department of Finance – Demographic Research Unit, 2009.

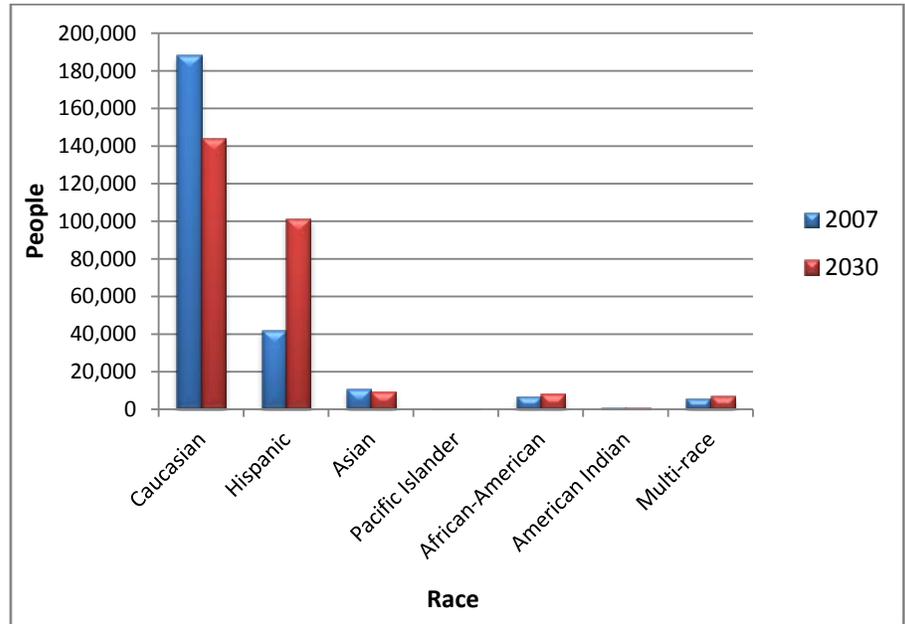
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12 In the three Golden Gate National Recreation Area gateway counties, the racial
 13 percentage shift from the present to 2030 varies considerably. According to the California
 14 Department of Finance projections, the racial percentages in the City and County of San
 15 Francisco will not change significantly between 2007 and 2030, with the exception of a
 16 notable decrease in African Americans. However, by 2030, Marin County will experience
 17 a significant numerical and percentage reduction in Caucasians, and an equally
 18 significant increase in Hispanic residents (numerical and percentage). According to the
 19 same forecasts, San Mateo County will also have a notably numerical and percentage
 20 decrease in Caucasian residents, with a large increase in Hispanic, Asian, and African
 21 American residents. Refer to figures 19 to 21 for more information.

22

1 **Figure 16: Population Estimate by Race in Marin County in 2007 and 2030**

2



3

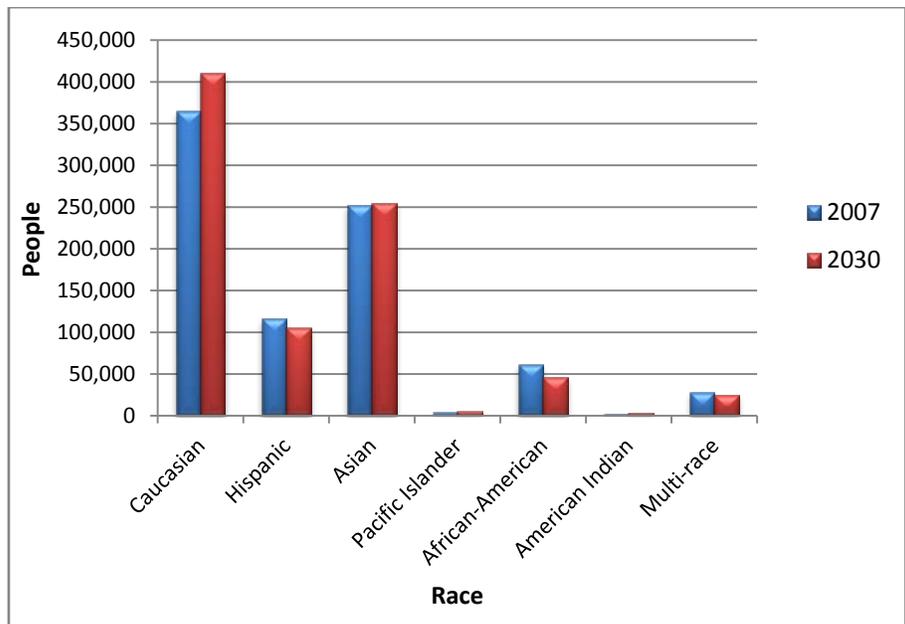
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6

Source: California Department of Finance – Demographic Research Unit, 2009.

7 **Figure 17: Population Estimate by Race in City & County of San Francisco in 2007 and 2030**



8

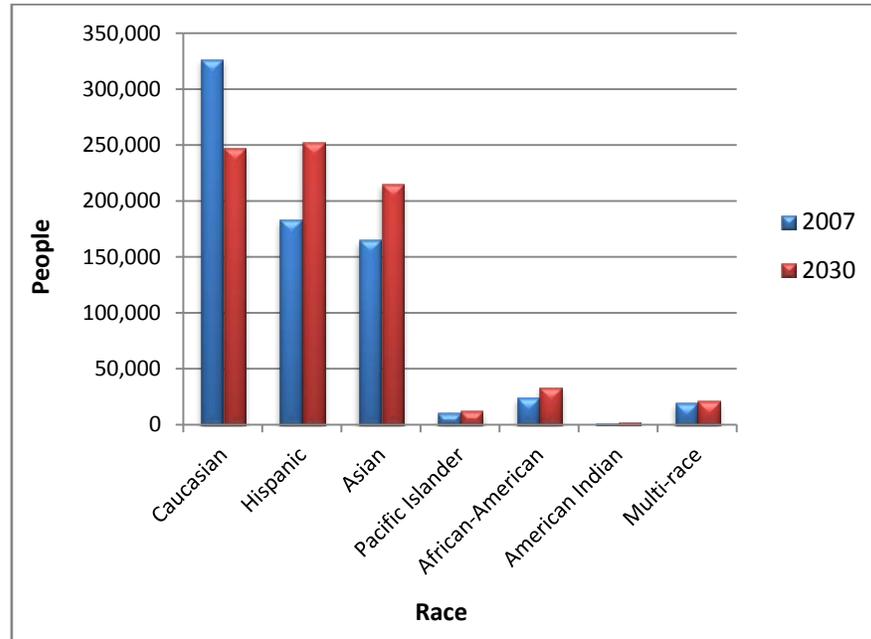
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10

Source: California Department of Finance – Demographic Research Unit, 2009.

1 **Figure 18: Population Estimate by Race in San Mateo County in 2007 and 2030**

2



3

4

5

Source: California Department of Finance – Demographic Research Unit, 2009.

6 **Income, Poverty, and Education**

7 Another factor that plays a role in park management and visitation trends is the income
 8 levels and poverty levels of residents who live in the vicinity of the park. A very
 9 noteworthy statistic from the California Department of Finance indicates that the three
 10 counties with the highest per capita incomes in the dtate as of 2005 were Marin, San
 11 Francisco, and San Mateo. In 2005, Marin County had a per capita income of \$75,844
 12 (the highest in the state), with San Francisco at \$62,614 and San Mateo at \$59,213
 13 (California Department of Finance, Economic/Financial Research Unit 2009).

14 As for poverty levels, 9.3% of the Bay Area’s population in 2007 was living below the
 15 poverty level, which was notably lower than the statewide figure of 12.7% (U.S. Census
 16 Bureau, 2005-2007; American Community Survey 2008). Marin and San Mateo counties
 17 had even lower poverty rates in 2007, 7.0% and 6.7%, respectively. Whereas, the City
 18 and County of San Francisco had a 2007 poverty rate of 11.7%, which was more in line
 19 with the State’s average.

20 Along similar lines, the level of education attained by community residents can often
 21 correlate to the aforementioned income and poverty characteristics. Table 4 lists the
 22 percentage of residents in each area (25 years or older) who attained various levels of
 23 education as of 2007. Generally, the Bay Area education levels are notably higher than
 24 that of the state of California as a whole (U.S. Census Bureau 2008). For example, in the
 25 state of California in 2007, 20% of the population over 25 years of age had not received a
 26 high school diploma (or equivalent), and 29% had attained either a bachelors or graduate

1 level degree. Whereas, in the Bay Area, 14% did not have a high school diploma and
 2 41% had attained a bachelors or graduate degree. More specifically, Marin County
 3 residents have an even greater level of education attainment, with only 8% without a high
 4 school diploma and 54% with a bachelors or graduate degree.

5

6 **Table 5: Percentage of 2007 Population (25 or older) who attained various levels of**
 7 **Education**

	California	Bay Area	Marin	San Francisco	San Mateo
No high school diploma (or equivalent)	20%	14%	8%	15%	12%
High school diploma, (or equivalent)	23%	20%	14%	15%	19%
Some college, but no degree	20%	19%	18%	14%	19%
Associates degree	8%	7%	6%	5%	7%
Bachelors degree	19%	25%	31%	31%	27%
Graduate or professional degree	10%	16%	23%	19%	16%

8

Source: U.S. Census Bureau, 2005-2007 American Community Survey, 2008.

9

10

11 **Housing and Urban Growth**

12 The last topic of population and community trends to discuss relates to the Bay Area's
 13 housing market and how the community adjusts to it. This section will identify current
 14 and projected trends in the housing market, and will highlight housing indicators such as
 15 home values, housing affordability, own/rent ratios, and single-family/multi-family
 16 dwelling ratios. As with other sections, information for the Bay Area and the individual
 17 counties of Marin, San Francisco, and San Mateo will be presented.

18 One of the most notable characteristics of the Bay Area housing market is its very high
 19 home prices and values. Several variables affect home prices in this area. However,
 20 generally speaking, the Bay Area's high housing costs result from a high level of housing
 21 demand (due to high population growth over past decades) coupled with a low level of
 22 housing production (ABAG 2008). Compounding matters, high housing costs also result
 23 from an imbalance in available housing types, since primarily large, single-family

1 housing units have been planned and built in many suburban Bay Area communities
 2 (ABAG 2007). In other words, the diversity of housing production (from low-density to
 3 high-density, and from low-cost to high-cost) has not been effectively synchronized with
 4 the diversity of housing demand over past years. Although a significant amount of
 5 demand existed for high-density and more centrally located housing in the Bay Area,
 6 much of the housing production was occurring on the Bay Area fringes, at lower housing
 7 densities. The result of this housing gap is high housing costs for a large percentage of
 8 Bay Area residents.

9 According to the U.S. Census Bureau’s 2005-2007 American Community Survey, the
 10 2007 median home value in the Bay Area was \$676,800. In the same year, Marin County
 11 had a much higher median home value of \$895,100. San Francisco’s median home value
 12 was \$789,400. However, since the majority of San Francisco housing is attached, multi-
 13 family attached units, the price per square foot in San Francisco is likely higher than
 14 surrounding areas (see table 6). In San Mateo County, the 2007 median home value was
 15 \$807,400 (U.S. Census Bureau 2008).

16
 17

Table 6: Percentage of 2007 Housing Stock, Detached and Attached Housing

	Bay Area	Marin	San Francisco	San Mateo
Single-family, Detached	64%	71%	34%	68%
Multi-family, Attached	34%	28%	66%	31%

18 Source: U.S. Census Bureau, 2005-2007 American Community Survey, 2008.

19
 20

21 Given these high housing costs, a large percentage of Bay Area residents cannot afford to
 22 own a home. In 2007, only about 15% of Bay Area households could afford a median-
 23 priced home. The affordability figures for Marin, San Francisco, and San Mateo counties
 24 were even lower: 13%, 10%, and 12% respectively) (ABAG 2008). San Francisco’s low
 25 affordability figure is also reflected in the low percentage (38%) of owner-occupied
 26 housing in San Francisco (see Table 7).

27 Given the projected decrease in Bay Area household size, and the projected increase in
 28 senior citizens who may be living, and possibly still working, in urban areas, demands for
 29 more compact urban housing units will likely increase as well. This demand may shift the
 30 housing production trends in the high demand urban areas of the Bay Area.

31 Also, as discussed in prior sections, the majority of the projected population growth in the
 32 Bay Area will be occurring in the eastern counties (Solano, Alameda, Contra Costa, and
 33 Santa Clara). As a result, additional low-density, single-family housing development, and
 34 a subsequent reduction of open space or undeveloped lands can be expected in this
 35 eastern area over the next few decades.

36
 37

1 **Table 7: Percentage of 2007 Housing Stock, Owner-occupied and Renter-occupied Housing**

	Bay Area	Marin	San Francisco	San Mateo
Owner-occupied	60%	65%	38%	63%
Renter-occupied	40%	35%	62%	37%

2 Source: U.S. Census Bureau, 2005-2007 American Community Survey, 2008.
3

4 **ECONOMIC EFFECTS OF THE PARK ON THE COMMUNITY**

5 Just as population growth and community demographics have significant effects on the
6 management and use of Golden Gate National Recreation Area, the park has significant
7 effects on the economy of the community around it. Just like many other economic
8 engines in the Bay Area (e.g., high-tech industry, finance industry), Golden Gate
9 National Recreation Area contributes to the local and regional economy by generating
10 business and revenue, creating jobs, and indirectly fueling economic growth in other
11 industries. This section identifies these economic impacts of Golden Gate National
12 Recreation Area and provides a synopsis of the overall Bay Area economy.

13

14 **The Park's Contribution to the Economic Stability of the Bay Area**

15 Golden Gate National Recreation Area has many direct and indirect positive effects on
16 the Bay Area's economy. This impact can be traced to several sources and attributes,
17 such as: money spent by park visitors at local businesses, jobs created at these local
18 businesses due to the park visitor demands, NPS jobs created at the park, NPS contracts
19 with local businesses, as well as other Bay Area tourism generated by Golden Gate
20 National Recreation Area. This section will highlight some of these factors and explain
21 the relevance to the overall Bay Area economy.

22 ***Contributions to Local Economy from Golden Gate National Recreation*** 23 ***Area Visitor Expenditures***

24 Each year, millions of Golden Gate National Recreation Area visitors contribute
25 hundreds of millions of dollars into the Bay Area economy. This injected money directly
26 sustains the revenue stream and jobs at hotels, restaurants, bars, and stores that serve park
27 visitors. Businesses primarily in the Golden Gate National Recreation Area gateway
28 counties of Marin, San Francisco, and San Mateo are the direct beneficiaries of this
29 economic contribution. In addition, the park visitor money stream can also have other
30 indirect, or secondary, effects. For example, this injected money that directly supports
31 local businesses and jobs eventually re-circulates further into the Bay Area economy and
32 beyond. This recirculation happens when the gateway local businesses buy products or
33 services from other sources (e.g., from wholesale suppliers), or when employees at the
34 local businesses use their income earned at the local gateway business at other businesses

1 in the area to sustain their lifestyle (e.g., grocery shopping, entertainment). This
 2 secondary effect is often referred to as an economic “multiplier” since one dollar injected
 3 into the local economy often has more than one dollar of effect in the local economy.

4 With funding from the NPS Social Science Research Program, researchers at Michigan
 5 State University have created the NPS “Money Generation Model 2” (MGM2) to
 6 measure these direct and indirect contributions from NPS park visitors to local
 7 economies. Dr. Daniel Stynes and Dr. Dennis Propst used the MGM2 model to analyze
 8 the effect that Golden Gate National Recreation Area park visitors had on the local
 9 economy in 2003. Table 8 lists the 2003 park visitation totals and the associated spending
 10 for each visitor type. “Visitor Party Days” refers to the number of days each visitor party
 11 or group spends in the Bay Area. This figure is calculated by converting the individual
 12 NPS recreation visits using estimates for average party size, length of stay in the area,
 13 and the number of park entries (visits) per trip.

14 As noted in the table, local day trips accounted for 80% of all Golden Gate National
 15 Recreation Area visitation in 2003, with each local day trip party spending an average of
 16 \$32 per day. Understandably, hotel-based visitor parties spent much more locally per day
 17 (\$229 per day). When all visitor types are included, the average Golden Gate National
 18 Recreation Area visitor party spent \$43 at local businesses per day. When these visitor
 19 expenditures are totaled for the entire year, the MGM2 model estimates that Golden Gate
 20 National Recreation Area visitors directly injected \$226,810,000 into the local economy
 21 in 2003.

22

23 **Table 8: 2003 Golden Gate National Recreation Area Visits and Estimated Spending, By**
 24 **Visitation Type**

25

	Local Day Trips	Nonlocal Day Trips	Hotel	Camp	Total
Recreation Visits	11,036,074	2,069,264	730,271	19,141	13,854,750
Percentage of Recreation Visits	80%	15%	5%	<1%	100%
Visitor Party Days	4,216,401	790,575	244,090	5,915	5,257,245
Avg. Spending Per Party Day	\$ 32	\$ 47	\$ 229	\$ 91	\$ 43
Total Spending (million's)	\$ 132.89	\$ 37.48	\$ 55.87	\$ 0.55	\$ 226.81

26 Source: Daniel Stynes, Ph.D. & Dennis Propst, Ph.D., Michigan State University, “Economic Impacts of Visitor
 27 Spending, by Parks” NPS Money Generation Model 2 (MGM2), 2003.
 28
 29

1 The model estimates listed in Table 8 show how this injected money circulated through
2 the local economy. Both direct and secondary effects are included. The direct effects of
3 these visitor expenditures include sales, income, and jobs in businesses selling goods and
4 services directly to park visitors. Thus, the \$226.81 million in Golden Gate National
5 Recreation Area visitor spending supported an estimated 4,107 jobs, as well as \$ 176.96
6 million in sales and \$ 67.05 million in personal income (wages and salaries.) As for
7 secondary, or multiplier effects, an additional \$94.13 million in sales and \$34.31 million
8 in personal incomes were generated by the Golden Gate National Recreation Area
9 spending as the money circulated through the local economy. An additional 1,194 jobs
10 were supported by this secondary effect. When all of these effects are totaled, the
11 \$226.81 million in Golden Gate National Recreation Area visitor spending supported a
12 total of \$271.09 million in sales, \$ 101.35 million in personal income and 5,300 jobs in
13 the community.

14 ***Contributions to Local Economy from National Park Service and Golden***
15 ***Gate National Recreation Area Operations***

16 The employment offered by the National Park Service at Golden Gate National
17 Recreation Area also contributes to the local economy. The social and economic benefits
18 of this job base are two-fold. First, the jobs made available by Golden Gate National
19 Recreation Area provide hundreds of Bay Area residents with a steady income that helps
20 sustain their lives and those of their families. Secondly, similar to the economic effects of
21 revenue generated by park visitation (as explained above), the income earned by Golden
22 Gate National Recreation Area employees also has direct and secondary effects on the
23 local economy. These employees contribute to the local economy by spending the money
24 they earn on goods and services in the community. This spending directly supports local
25 businesses and their growth. The local communities also benefit directly via the sales tax
26 generated by this spending. In addition, secondary economic benefits (i.e., the multiplier
27 effect) are realized when this money eventually re-circulates further into the Bay Area
28 economy and beyond.

29 Since Golden Gate National Recreation Area employees reside throughout the entire Bay
30 Area, the economic effect of their earned salaries (and subsequent spending in their
31 respective communities) extends throughout the area as well. Table 10 summarizes the
32 job base provided by Golden Gate National Recreation Area as well as the salary totals
33 for these jobs. The table also identifies where these Golden Gate National Recreation
34 Area employees live, which hints at where the most direct contributions to the local
35 economy occur.

36
37
38

1 **Table 9: 2003 Estimated Economic Contributions of Golden Gate National Recreation Area**
 2 **Visitor Spending, By Sector**

Sectors	Sales (millions)	Personal Incomes (millions)	Jobs Supported	Value Added (millions)
Direct Effects				
Motel, Hotel, B&B and Cabins	\$ 26.39	\$ 9.34	489	\$ 14.19
Campsites	\$ 0.13	\$ 0.05	2	\$ 0.07
Restaurants & Bars	\$ 63.84	\$ 22.67	1,725	\$ 31.58
Admissions & Fees	\$ 30.03	\$ 10.61	819	\$ 17.36
Retail	\$ 35.49	\$ 18.10	870	\$ 28.28
Others	--	<u>\$ 6.28</u>	<u>201</u>	<u>\$ 9.80</u>
Total	\$ 176.96	\$ 67.05	4,107	\$ 101.29
Secondary Effects				
	\$ 94.13	\$ 34.31	1,194	\$ 58.51
Total Effects	\$ 271.09	\$ 101.35	5,300	\$ 159.80

3 Source: Daniel Stynes, Ph.D. & Dennis Propst, Ph.D., Michigan State University, "Economic Impacts of Visitor
 4 Spending, by Parks"; NPS Money Generation Model 2 (MGM2), 2003.

5
6
7

1 **Table 10: 2009 Golden Gate National Recreation Area Jobs and Salaries, By Location of**
 2 **Residence**

Location of Golden Gate National Recreation Area Employee Residence	Jobs	Salary Totals
Marin County	88	\$6,354,302
San Francisco City & County	96	\$6,192,113
San Mateo County	33	\$2,031,223
Other Bay Area Counties	116	\$7,755,854
Beyond Bay Area in California	8	\$465,400
Totals	341	\$22,798,892

3 Source: Golden Gate National Recreation Area, National Park Service, 2009.
 4

5 As highlighted in Table 9, the operation of Golden Gate National Recreation Area creates
 6 341 NPS jobs. The salaries for these jobs total to \$22.8 million per year. Although each
 7 individual employee spends and saves their earned salary money according to their own
 8 personal standards, one can conclude that a large percentage of this \$22.8 million
 9 circulates back into the local economy via the purchases of goods and services. All but
 10 \$465,400 of this salary total goes to employees who reside and spend directly within the
 11 Bay Area. In addition, nearly two-thirds of the Golden Gate National Recreation Area
 12 NPS employees (and their respective salaries) reside in the three Golden Gate National
 13 Recreation Area gateway counties (217 jobs; \$14,577,638 in salary).

14 In addition to the employee salaries, the NPS operation of Golden Gate National
 15 Recreation Area also supports the local economy by contracting out services with private
 16 enterprises in the Bay Area. These government contracts help support other businesses
 17 and their employees, which also has secondary multiplier effects when this money
 18 circulates through the community. In the NPS fiscal year of 2008, the National Park
 19 Service spent \$14,807,075 on contracts with private entities.

20 ***Tourism Attraction that Complements San Francisco and Other Bay***
 21 ***Area Sites***

22 In addition to generating direct monetary injections into the local economy and
 23 supporting other local institutions, Golden Gate National Recreation Area also
 24 contributes to the economy by helping generate tourism to other Bay Area attractions.
 25 This economic value primarily applies to visitors who come from outside of the Bay
 26 Area. From a tourist perspective, the allure of visiting the Bay Area is notably enhanced
 27 by the many sites, amenities, and resources of Golden Gate National Recreation Area.
 28 When these Golden Gate National Recreation Area attractions are considered collectively
 29 with other Bay Area attractions, the Bay Area becomes a very appealing region to visit.

1 The value of this synergistic effect extends well beyond the state of California, and the
2 United States for that matter. International tourism in the Bay Area is a strong and
3 growing industry. In addition, Golden Gate National Recreation Area contributes to the
4 Bay Area's international tourism draw. For example, nearly 25% of visitors to Alcatraz
5 Island came from other countries (Manning, et al. 2007). When combined with the Bay
6 Area's other diverse attractions, the many sites and resources of Golden Gate National
7 Recreation Area play an important role in sustaining and expanding this international
8 tourism market.

9

10 **Bay Area Commerce and Industry Trends**

11 As the Bay Area population has grown and diversified over the past 100 years, the local
12 economy has also expanded and evolved. These changes have been brought on by local,
13 state, national, and international attributes and events. For example, events such as World
14 War II and the high-tech boom have played integral roles in the Bay Area's economic
15 development over the years.

16 The Bay Area's economic history over the past 100 years can be defined by three very
17 general eras:

- 18 • 1900s to World War II – This economic era can be described as being somewhat
19 pastoral, with the local economy being driven by industries such as seaport
20 commerce, dairy farming, and fishing.
- 21 • World War II era – The Bay Area served as Central Command for the U.S. Army
22 Pacific operations during WWII. As a result, the driving force on the local
23 economy shifted toward military sea and air base activities and manufacturing.
- 24 • Post-World War II through Late 20th century to present – Over the past several
25 decades, the Bay Area's economy has evolved, grown, and diversified
26 considerably. The notable driving forces of the diversified economy include
27 finance, education, local and regional tourism, health, arts, information
28 technology, and expanding Asian markets.

29

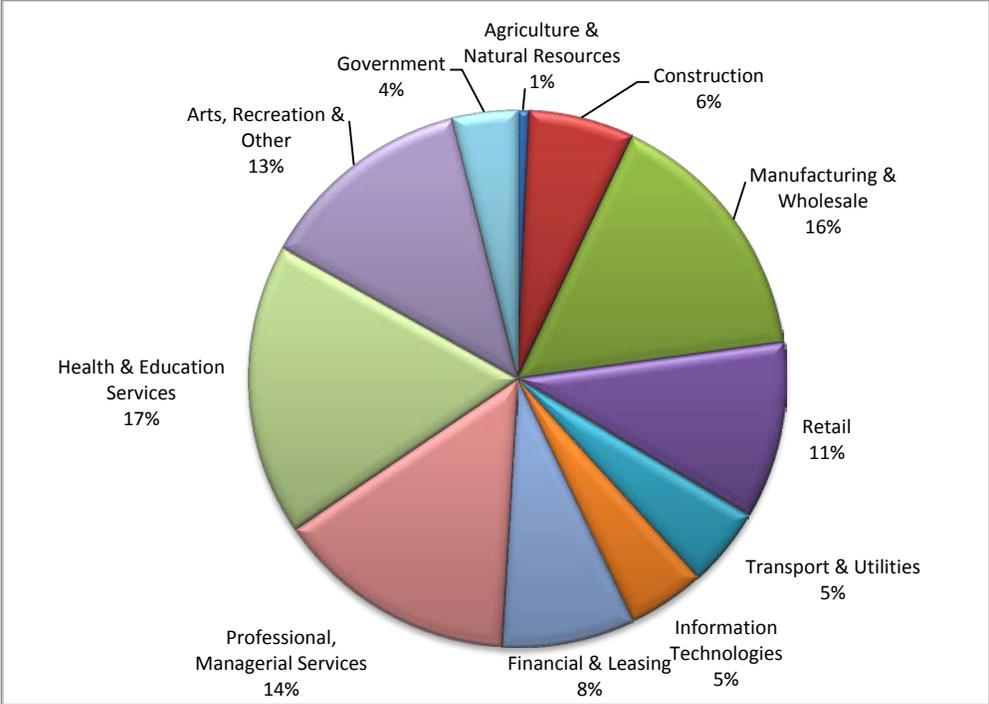
30 The following two graphs display the make-up of the Bay Area economy via job numbers
31 in the various contributing economic sectors or industries. Figure 22 highlights the
32 percentage distribution of jobs across all sectors in 2005. Figure 23 identifies the
33 anticipated job growth in each of these sectors through 2030.

34

35

1 **Figure 19: 2005 Bay Area Jobs, by Sector**

2

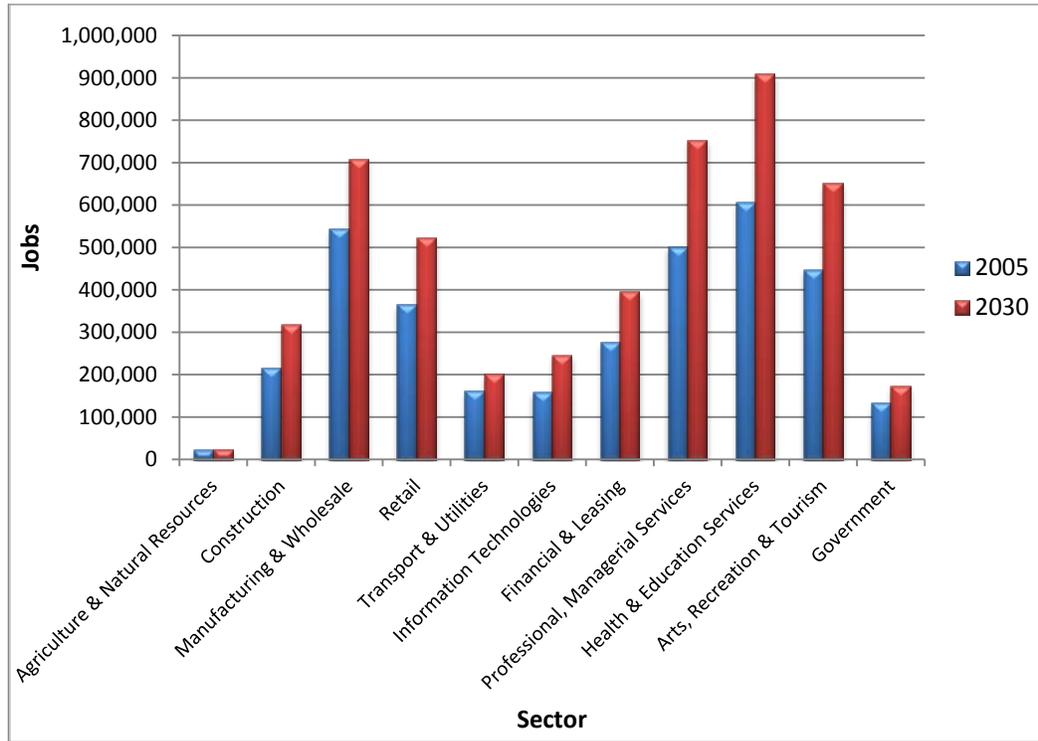


Source: Association of Bay Area Governments (ABAG), "Projections 2007," 2007.

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1 **Figure 20: 2005 – 2030 Bay Area Employment Projections, by Sector**

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Source: Association of Bay Area Governments (ABAG), "Projections 2007," 2007

TRANSPORTATION IN THE PLANNING AREA (INCLUDING BOTH GOLDEN GATE NATIONAL RECREATION AREA AND MUIR WOODS NATIONAL MONUMENT)

5

6 This section summarizes existing transportation conditions for Golden Gate National
7 Recreational Area park sites. It addresses both internal circulation and access by all
8 modes, including automobile, public transportation, bicycle, and pedestrian. Descriptions
9 of conditions for Golden Gate National Recreation Area park sites are grouped by county
10 (Marin, San Francisco, and San Mateo), with the exception of two park sites, Alcatraz
11 Island and Muir Woods National Monument, which will be considered separately.

12 Analysis was conducted using a range of available materials, most of which are
13 referenced directly within the text. Primary sources included the Phase 1 Transportation
14 Analysis developed for this *General Management Plan*, for which a database
15 incorporating information from close to 100 sources was developed by Golden Gate
16 National Recreational Area staff. Raw data on transportation conditions collected in
17 recent years were provided to the authors by Golden Gate National Recreation Area staff.
18 Additional sources, such as California Department of Transportation traffic counts, were
19 also used.

20

21 REGIONAL TRANSPORTATION CONTEXT

22 Existing and Projected Travel Demand

23 The Golden Gate National Recreation Area is located within the San Francisco Bay Area,
24 a metropolitan region of approximately 7 million residents. In the counties surrounding
25 the Bay Area, there are another 3.9 million residents (U.S. Census Bureau 2009). In all,
26 close to 11 million people live within roughly a two-hour drive of Golden Gate National
27 Recreation Area park sites.

28 This urban context, along with their popularity among tourists, places heavy demands on
29 park sites. In 2007, the Golden Gate National Recreation Area experienced total visitation
30 of 20.8 million. While park sites in San Francisco are generally accessible to motorists,
31 transit users, cyclists, and pedestrians, roads to and within many park sites in Marin and
32 San Mateo counties are winding and narrow, and parking is limited in many places.
33 These locations can “feel” remote during off-peak periods despite their relative proximity
34 to millions of residents. While many might view these qualities as assets, on busy
35 summer weekends two-lane roads leading to popular park sites can become severely
36 congested.

37 Already, the Bay Area is America’s second most-congested metropolitan region, behind
38 only Los Angeles (Schrank and Lomax 2007), with an average yearly delay per motorist
39 caused by congestion of 60 hours. By 2030, the population of the Bay Area is expected to
40 grow to 8.7 million, and the surrounding counties are projected to reach 5.7 million,

1 resulting in a total population within a two-hour drive of Golden Gate National
2 Recreation Area park sites of approximately 14.4 million. (California Department of
3 Finance 2007). The total number of vehicle miles traveled in the Bay Area on an average
4 weekday is projected to increase from approximately 136 million in 2006 to as much as
5 179 million by 2035 (Metropolitan Transportation Commission 2008). Still, residents of
6 the San Francisco-Oakland urbanized area take more trips, per capita, on public
7 transportation than do residents of any other U.S. urbanized area except New York: about
8 130 per year, on average (American Public Transportation Association 2008).

9

10 **Regional Transportation Policy**

11 In order to accommodate population growth without compromising the regional
12 environment or economy, Bay Area policymakers have increasingly sought to steer
13 development and transportation trends in more sustainable directions. In its introduction
14 to the *Transportation 2035 Plan for the San Francisco Bay Area*, the Metropolitan
15 Transportation Commission (MTC), stated that:

16 *By means of its investment choices and adopted policies, the Draft*
17 *Transportation 2035 Plan aims to stimulate the use of public transit, increase the*
18 *safety, utility and appeal of bicycling and walking, and reduce emissions by*
19 *private automobiles in the Bay Area while increasing the efficiency of the*
20 *roadway systems for all users.*

21 While the Metropolitan Transportation Commission—through the Regional
22 Transportation Plan and related Transportation Improvement Program—sets funding
23 priorities regionally, most transportation planning decisions in the Bay Area are made
24 either at the county level by congestion management agencies (CMAs) or by transit
25 agencies as part of their Short Range Transit Plans. Regional and local transit agencies
26 are identified on the following pages. Congestion management agencies in counties with
27 Golden Gate National Recreation Area park sites include the Transportation Authority of
28 Marin, San Francisco County Transportation Authority, and City/County Association of
29 Governments of San Mateo County. Marin, San Francisco, and San Mateo are all “self-
30 help” counties under California law, meaning that voters have approved local sales taxes
31 devoted to transportation.

32

33 **Regional Transportation Network**

34 The Bay Area is home to one of the nation’s most expansive highway systems. The
35 regional transit network is less developed, although regional rail systems and ferry routes
36 provide nonmotorized access to some Golden Gate National Recreation Area park sites
37 via local rail and feeder bus connections. Major roadways and regional rail and ferry lines
38 are shown in Figure 1.

39

1 Three major highways provide primary access to Golden Gate National Recreation Area
2 park sites:

- 3 • *U.S. Highway 101*, which is a freeway in Marin and San Mateo counties and
4 southern San Francisco and an arterial surface route in northern San Francisco,
5 provides access to park sites in all three counties.
- 6 • *California Route 1*, which transitions from a two-lane highway in Marin County
7 to an urban arterial in San Francisco and a freeway in northern San Mateo
8 County before returning to a two-lane highway in southern San Mateo County,
9 also provides access to park sites in all three counties.
- 10 • *Interstate 280*, a freeway, provides access to Golden Gate National Recreation
11 Area park sites in San Francisco and in San Mateo County.

12 Two regional railways and several ferry routes, meanwhile, provide transit access to
13 Golden Gate National Recreation Area park sites:

- 14 • *Bay Area Rapid Transit*, or BART, is a metro system serving San Francisco,
15 Alameda, and Contra Costa counties, as well as northern San Mateo County.
16 From BART stations in San Francisco and San Mateo counties, local transit
17 service is available to park sites in San Mateo, San Francisco, and Marin
18 counties.
- 19 • *Caltrain* is a 77-mile-long commuter rail line operating from Santa Clara County
20 through eastern San Mateo County to San Francisco. Local buses provide
21 connections from Caltrain stations to park sites in San Mateo, San Francisco, and
22 Marin counties.
- 23 • *Ferry* service is provided by the Golden Gate Bridge, Highway & Transportation
24 District as Golden Gate Ferry, and by a private operator, Blue & Gold Fleet. At
25 Sausalito in Marin County and in San Francisco, ferry connections can be made
26 to Golden Gate National Recreation Area park sites. Ferries also provide the only
27 public access to Alcatraz Island. (The 2007 *Golden Gate National Recreation*
28 *Area Water Shuttle Access Study & Conceptual Plan* proposed additional ferry
29 service to three Golden Gate National Recreation Area park sites: Fort Baker,
30 Fort Mason, and the Presidio/Crissy Field in San Francisco.)

31
32 “Transbay” buses operated by the East Bay’s AC Transit also connect to San Francisco
33 Municipal Railway (MUNI) routes serving Golden Gate National Recreation Area park
34 sites at San Francisco’s Transbay Transit Center. While most Transbay routes are
35 commuter-oriented—offering the greatest amount of service during weekday morning
36 and evening commuting periods—a few provide midday and weekend service.

37
38
39
40

Figure 21: Regional Transportation Network

INSERT EIGHT (8) TRANSPORTATION SYSTEM MAPS INTO THIS SECTION.

All are 11x17

Marin: 2 maps

SF: 4 maps

San Mateo: 2 maps

Figures list in Table of Contents needs to be updated.

Back of map

1 **Summary**

2 In general, the Bay Area transportation network is oriented toward commuters, and
3 access to Golden Gate National Recreation Area park sites, which are generally relatively
4 remote, is limited. Even in San Francisco, many Golden Gate National Recreation Area
5 park sites are on the city’s west side, some distance from regional road and public transit
6 networks. Transit access to park sites in Marin and San Mateo counties is especially
7 limited.

8

9 **TRANSPORTATION NETWORK**

10 In this section, transportation conditions are first described for the two most-visited park
11 sites in the planning area, Muir Woods National Monument and Alcatraz Island. Then
12 conditions are described for park sites in each county: Marin, San Francisco, and San
13 Mateo. Within each section, conditions are first summarized, then described by mode.
14 Conditions are analyzed both in terms of access to park sites and internal circulation.
15 Detailed maps of each county’s transportation network can be found in their respective
16 sections.

17 **Muir Woods National Monument**

18 Muir Woods National Monument is a fee site and a major tourist destination with an
19 annual visitation of more than 800,000; this is in spite of its relative inaccessibility.
20 Traffic on two-lane roads leading to the site regularly backs up, and parking lots regularly
21 fill by noon on busy summer weekends. With the exception of summer and “shoulder
22 season” weekends, there is no public transit service. Bicycle and pedestrian access to the
23 remote canyon site is arduous. Parking at the site is especially problematic; on busy days,
24 more cars are parked informally along roadside shoulders than in the main or satellite
25 lots, resulting in traffic congestion near the park entrance and conflicts between autos and
26 pedestrians.

27 **Traffic and Parking**

28 Auto access to Muir Woods National Monument is along a narrow, twisting route that
29 approaches from the east by way of a steep descent (with an average grade of more than 8
30 percent).

31 Traffic congestion along Shoreline Highway approaching the National Monument can be
32 severe during peak periods. The 2004 *Comprehensive Transportation Management Plan*
33 *for Parklands in Southwestern Marin* (CTMP) indicated a peak season intersection level
34 of service (LOS) of “F,” at the “Tam Junction” intersection of Shoreline Highway with
35 Almonte Boulevard in Tamalpais Valley. “F” is the lowest level of service, indicating
36 average delay per vehicle of more than 50 seconds. The CTMP also reported an accident
37 rate along Panoramic Highway, a two-lane but relatively direct route along the spine of
38 Dias Ridge between Shoreline Highway and Muir Woods Road, that was 140 percent
39 higher than the statewide average for similar roads (Robert Peccia & Associates 2004).

40 It is estimated that even on summer weekends when Muir Woods Shuttle service is
41 available, more than 60% of Muir Woods National Monument visitors arrive by private

1 automobile (Nelson\Nygaard Consulting Associates 2008). Golden Gate National
2 Recreation Area has estimated average vehicle occupancy of 2.5 persons, meaning that
3 close to 1,200 autos might arrive at the National Monument over the course of a busy
4 day. In 2004, as many as 2,855 cars were counted on Upper Muir Woods Road in a single
5 day, suggesting that the actual number of cars arriving at the National Monument on a
6 busy day might be even higher. Also in 2004, up to 344 cars were observed arriving at
7 the monument in a single hour (Robert Peccia & Associates 2004).

8 This traffic results not only in congestion on roads approaching the national monument,
9 but in congestion in the main and satellite parking lots, as cars circle in search of parking.
10 It also results in congestion and auto-pedestrian conflicts along Muir Woods Road just
11 west of the park—where overflow parking is accommodated along the shoulder and
12 pedestrians must at some points walk in the roadway. Officially, there are 179 parking
13 spaces at Muir Woods National Monument in the main and satellite lots, and
14 approximately 175 additional spaces that are considered legal along Muir Woods Road;
15 the total then is approximately 350 parking spaces. However, up to 475 cars have been
16 observed parked near the national monument at one time (Robert Peccia & Associates
17 2004). This is possible because motorists will park along the shoulder of Muir Woods
18 Road up to a mile from the park entrance, a practice that is clearly not amenable to
19 visitors.

20 **Public Transit**

21 ***Muir Woods Shuttle***

22 Established in 2005 as a pilot program, the Muir Woods Shuttle is now funded on an
23 annual basis by Golden Gate National Recreation Area and the Marin County Transit
24 District, or Marin Transit. Golden Gate Transit operates the route as transit route 66,
25 although prior to the 2010 season, Marin Transit intends to put operation of the service
26 out for bid.

27 The shuttle is a seasonal service, operating on weekends from May through September.
28 From Memorial Day weekend to Labor Day weekend, it consists of two routes:

- 29 • A Marin-City-to-Muir-Woods-National-Monument route operating on 20-minute
30 headways from the Golden Gate Transit hub at Marin City (where connections
31 can be made to buses from San Francisco) to the monument. This route also also
32 stops at satellite parking lots near the junction of Highways 101 and 1
- 33 • A Sausalito-to-Muir-Woods-National-Monument route timed to connect with
34 Golden Gate Ferry service from San Francisco at Sausalito (this route also serves
35 Marin City and the Highway 1/101 junction)

36 During the “shoulder season,” there is no Sausalito service, and the Marin City route
37 operates on 30-minute headways.

38 Much of the shuttle’s ridership consists of motorists who, informed by variable message
39 signs on Highway 101 that the monument parking lots are full, follow instructions to exit
40 at Route 1, park, and take the shuttle instead. While the shuttle is relatively expensive to
41 operate (it had a 2008 budget of \$356,000, with a farebox recovery rate of 22%,
42 comparable to many urban transit services), ridership has grown from just more than

1 10,000 in its first year to approximately 34,500 in 2008, even as the formerly free service
2 has increased fares to \$3. Close to 10% of summer weekend visitors to the park now
3 arrive by shuttle, and in 2008, it averaged 18.9 passengers per hour, higher than many
4 suburban bus routes (Nelson\Nygaard Consulting Associates 2008).

5 The Muir Woods Shuttle has eased pressure on the overburdened parking areas at the
6 monument and on the roads leading to the site. In addition, by connecting to regional
7 transit services, it has greatly expanded visitor access to the park. Moreover, surveys of
8 shuttle riders and other park visitors indicate that significant demand may exist for direct
9 service between San Francisco and the monument; while relatively expensive to operate,
10 this would serve to further reduce demand for automobile access to the monument.

11 ***Tour Bus***

12 While no data is available on private tour bus operators serving Golden Gate National
13 Recreation Area park sites, park staff believe that up to 20% of visitors to the monument
14 may arrive by tour bus. Twelve to fourteen spaces in the lower parking lot are reserved
15 for tour buses, and multiple operators provide tours, typically departing from San
16 Francisco and including a stop in Sausalito.

17 ***Bicycle and Pedestrian***

18 While bicycle access to Muir Woods National Monument requires travel over the same
19 congested and challenging route used by cars, there is bicycle parking. Given the site's
20 remoteness, meanwhile, pedestrian access is limited, although several trails converge on
21 the monument (including the Dipsea Trail, which connects the monument to Stinson
22 Beach nine miles west).

23 ***Summary***

24 Muir Woods National Monument is accessed primarily by automobile or tour bus,
25 although public transit service is available on summer and "shoulder season" weekends.
26 Cyclists and pedestrians must bike or hike long distances to reach the remote site,
27 although trails within the monument are very good. Parking at the monument is limited
28 and not well-configured—overflow parking along the shoulders of a narrow road is
29 common—and this results both in congestion and in conflicts between traffic and
30 pedestrians.

31

32 ***Alcatraz Island***

33 With approximately 1.4 million annual visitors, despite admission fees starting at \$26,
34 Alcatraz Island is Golden Gate National Recreation Area's most visited site. Alcatraz is
35 located on an island in San Francisco Bay; the only access to the park site is by ferry.
36 However, ferries depart from a landing near Fisherman's Wharf in San Francisco, which
37 is relatively accessible by all modes of transportation.

38 ***Traffic and Parking***

39 Automobile access to the Alcatraz Island ferry landing at Pier 33, just southeast of
40 Fisherman's Wharf, is generally good. The site is immediately adjacent to the
41 Embarcadero, a six-lane boulevard connecting directly to the San Francisco-Oakland Bay

1 Bridge (Interstate 80) and Interstate 280, and indirectly to Highway 101. Pier 33 is also
2 adjacent to Bay Street, a four-lane roadway connecting to Highway 101 and the Golden
3 Gate Bridge. However, all of these routes can become congested during peak hours.

4 Parking near the Alcatraz Island ferry landing at Pier 33 is fee parking, and much of it
5 consists of on-street meters with time limits of two hours or less. However, several large
6 garages are located nearby.

7 **Public Transit**

8 Ferry service to Alcatraz Island currently departs from Pier 33. Service is provided by
9 Alcatraz Cruises, a park concessionaire, and operates as often as every 30 minutes. Other
10 ferry operators also offer Bay tours that pass by Alcatraz Island and other Golden Gate
11 National Recreation Area waterfront park sites. A number of public transportation
12 options within San Francisco provide visitors with access to Pier 33.

13 **Bicycle and Pedestrian**

14 Pier 33 is easily accessible by bicycle. Bicycles are not allowed aboard Alcatraz Island
15 ferries, but limited bicycle parking is available at Pier 33 on a first-come, first-served
16 basis.

17 Likewise, pedestrian access is good. From the south, a broad promenade runs alongside
18 the Embarcadero, and San Francisco city streets to the west generally feature spacious
19 sidewalks. To access Pier 33, however, most pedestrians must cross the Embarcadero, a
20 six-lane roadway with a streetcar line in its median.

21 **Summary**

22 Alcatraz Island can be accessed only by ferry from San Francisco, although access to the
23 ferry landing is good for all modes of transportation. While parking is fee parking only,
24 there are several large garages nearby, public transit access is excellent, and bicycle and
25 pedestrian access over San Francisco city streets is likewise very good.

26

27 **MARIN COUNTY**

28 Golden Gate National Recreation Area park sites within Marin County are generally
29 distinct in character from those in San Francisco and San Mateo counties. As Marin
30 County park sites are located within western Marin County, many are some distance from
31 the county's developed eastern shore. Due to this isolation, Golden Gate National
32 Recreation Area park sites in Marin County are accessed primarily by automobile,
33 although limited public transit service is available, and many recreational cyclists ride
34 long distances to access them. In addition, there is limited water access for private boats
35 to Fort Baker through a marina, and signage both within the parks and on roads leading to
36 them is generally clear and highly visible.

37 The relative remoteness of Golden Gate National Recreation Area park sites within Marin
38 County contributes to their popularity with both residents and tourists. However, it also
39 results in severe congestion during peak periods, both on roads leading to the park sites
40 and around parking areas. Congestion is compounded by conflicts between automobile

1 and pedestrians, who often must walk in or alongside roadways due to a lack of
2 infrastructure including both sidewalks and trails paralleling roadways.

3 Means of visitor access to the Marin Headlands were sampled on Fridays, Saturdays, and
4 Sundays in the summer of 2000 and spring of 2001. The survey showed that 91% arrived
5 by private automobile, 4.7% by bicycle, 4% by buses (including public transit as well as
6 private, chartered, and school buses), while just 0.2% arrived on foot (National Park
7 Service 2009).

8

9 **Traffic and Parking**

10 Many visitors to Marin County Golden Gate National Recreation Area park sites arrive in
11 the county by driving over the Golden Gate or Richmond bridges, and even residents of
12 Marin County use Highway 101 for parts of their trips. Once motorists have exited
13 Highway 101, however, access to Golden Gate National Recreation Area park sites
14 requires steep, winding, “rollercoaster” drives on narrow rural roads.

15 Average volumes of traffic on these roads do not necessarily suggest congestion, and
16 outside of the busiest peak periods, there is little congestion on roads leading to or within
17 Golden Gate National Recreation Area park sites in Marin County. However, traffic
18 increases significantly on summer and holiday weekends. Annual average daily traffic on
19 Route 1 in the area of Stinson Beach, for example, is just 4,100 vehicles per day, and
20 peak hour traffic is 420 cars per hour, or 7 vehicles per minute in both directions
21 combined (California Department of Transportation 2009). Yet, the number of cars at the
22 entrance to Stinson Beach reached 39,709 in July 2007, 455% higher than in January, and
23 in 2004, counts reached 4,451 in a single summer day (Nonmotorized Transportation
24 Pilot Program 2005). Even greater monthly traffic has been observed along Conzelman
25 Road in the Marin Headlands, where 80,300 vehicles were recorded at a point in the
26 Rodeo Valley in the month of September 2007. In 2000, traffic counts on roads entering
27 and exiting the Headlands near the northern end of the Golden Gate Bridge found
28 combined traffic on summer weekends of approximately 10,200 vehicles, with about
29 two-thirds on Conzelman Road and the remainder on Bunker Road. Summer 2000
30 weekend traffic on Alexander Avenue (which is just outside the Headlands, and thus not
31 maintained by the National Park Service), just to the east of the Headlands and above
32 Fort Baker, was approximately 11,300 vehicles (National Park Service 2009).

33 National Park Service-managed roads within the park lands of Marin County also are
34 often in a poor state of repair. A 1999 survey of pavement conditions within the Marin
35 Headlands and Fort Baker found fully two-thirds of roads to be in poor condition
36 (National Park Service 2009). Conditions have not changed significantly since then,
37 although 11 miles of NPS roads in the Marin Headlands and Fort Baker are programmed
38 for rehabilitation between 2010 and 2012.

39 The greatest traffic congestion within Golden Gate National Recreation Area park sites
40 appears to occur immediately around parking areas. Whether they consist of large lots or
41 informal, roadside parking along shoulders, cars pulling into or out of parking areas and
42 pedestrians traveling to or from their cars create congestion and unsafe conditions along
43 narrow roads.

1 This congestion is a result of demand exceeding supply, with undesirable shoulder
2 parking as a result. At the Tennessee Valley trailhead, where there are 86 formal parking
3 spaces, the CTMP reported maximum occupancy including cars parked alongside
4 Tennessee Valley Road of 202 vehicles, or 235% of capacity. Parking lots at Stinson
5 Beach (124%) and Muir Beach (107%) were also found to be filled beyond capacity
6 (Robert Peccia & Associates 2004). The Marin Headlands/Fort Baker Transportation
7 Plan, meanwhile, reported up to 35 cars parked at Battery Mendell in the Marin
8 Headlands, in an area with a capacity of 30, and 24 cars were in 24 spaces at Battery
9 Spencer, where, as at Muir Woods National Monument, cars, buses and pedestrians come
10 into conflict when there is parking along a narrow road (National Park Service 2009). All
11 Golden Gate National Recreation Area parking within the plan area is currently free.

12 **Public Transit**

13 Public transportation access to Marin County Golden Gate National Recreation Area park
14 sites is limited. Most destinations within the park lands are inaccessible via transit
15 without significant hiking or biking from the closest transit stops, although a few park
16 sites are served directly or indirectly by infrequent, weekend-only or seasonal bus routes.
17 Most of those routes serve a limited area, although connections can be made to regional
18 services in eastern Marin County and San Francisco. Three public transit agencies
19 provide some form of service to Golden Gate National Recreation Area park sites, while
20 a seasonal shuttle service to Muir Woods National Monument is operated jointly by the
21 National Park Service and a local transit provider. In general, transit service in Marin
22 County is either oriented toward commuters (Golden Gate Transit) or those taking local
23 trips (Marin Transit), or serves Golden Gate National Recreation Area park sites but only
24 on a limited basis (West Marin Stagecoach). More information on public transit services
25 to Marin County Golden Gate National Recreation Area park sites can be found in
26 appendix E.

27 While no data is available on private tour bus operators serving Golden Gate National
28 Recreation Area park sites, park staff believes that up to 20% of visitors to Muir Woods
29 National Monument may arrive by tour bus. Twelve to fourteen spaces in the lower
30 parking lot are reserved for tour buses, and multiple operators provide tours, typically
31 departing from San Francisco and including a stop in Sausalito. Tour bus use is also
32 common (if accounting for a relatively small mode share) in the Marin Headlands and
33 Fort Baker.

34

35 **Bicycle**

36 Western Marin County is a popular destination for recreational cyclists. Despite blind
37 curves and heavy traffic, road cyclists seeking a challenge are a common sight on its
38 steep, narrow roads, while mountain biking remains popular on fire roads and trails
39 throughout Marin County, the birthplace of the sport. Many San Francisco visitors rent
40 bicycles and ride them over the Golden Gate Bridge making the return trip via ferry from
41 Sausalito. Alexander Avenue between Sausalito and the Bridge is a popular route for
42 cyclists (although it lacks a complete bike lane, and is confusing and potentially unsafe
43 for novice cyclists), as are roads through Fort Baker below the Avenue.,

1 **Figure 22:** Marin County Transportation Network

2

- 1 Back of map

On May 11, 2008, a sunny Sunday, Golden Gate National Recreation Area counted 1,432 cyclists northbound on Alexander at Bunker Road, above Fort Baker.

Although amenities for cyclists are currently limited, there is bicycle parking at Battery Spencer. As part of the Marin Headlands/Fort Baker Transportation Plan (2009), a number of improvements for bicyclists would be made. These include roadway improvements to enhance bicycle safety; a new bicycle and pedestrian path between the Headlands and Fort Baker; new trail access; and an uphill bicycle lane on Conzelman Road from Alexander Avenue to McCullough Road.

Pedestrian

The key issue for pedestrians at Marin County park sites is conflicts with automobiles near parking areas; this issue was described at length in the previous sections on Marin County Traffic and Parking. Remaining pedestrian issues are addressed below.

Golden Gate National Recreation Area park sites in Marin County are generally relatively remote. Muir Beach and Stinson Beach are adjacent to small communities that are surrounded by park land, while the eastern edge of the park lands in the county's southwestern corner is bordered by the larger communities of Marin City, Tamalpais Junction and Mill Valley. This situation limits pedestrian access to park sites. Even in those residential areas adjacent to park lands, there are few sidewalks, and residents of southern Marin County often drive to nearby trailheads, such as Tennessee Valley. Tourists sometimes walk over the Golden Gate Bridge from San Francisco into Marin County, but are not likely to ascend into the Marin Headlands farther than Battery Spencer, which is a short distance beyond the northern end of the Bridge.

However, Golden Gate National Recreation Area park sites in Marin County feature an extensive network of fire roads and trails of all types. These trails traverse diverse environments, from shoreline cliffs to inland ridges and valleys, and from grasslands to chaparral and cypress, eucalyptus, and redwood forests.

Long trails connect park sites miles apart, such as the California Coastal Trail from Muir Beach to the Golden Gate Bridge, the Bay Area Ridge Trail, the Bay Trail, and Dipsea Trail. Trail connectivity is also good, both within Golden Gate National Recreation Area park sites and to trails extending into adjacent parklands such as Mount Tamalpais State Park. Coverage is dense in the southern parklands, extending from Muir Beach into Tennessee Valley and the Marin Headlands. While many trails within Marin County park sites are multi-use, bikes, dogs, or horses are not allowed on some trails.

Summary

Marin County park sites are accessed primarily by private automobile, causing considerable congestion during peak periods on winding two-lane roads and exceeding the capacity of limited parking supplies at popular locations. There is little public transit service to park sites within Marin County. While bicycle access can be challenging due to topography and narrow roadways, these parklands are popular destinations for

recreational cyclists. There is little pedestrian access to the park sites, but hiking is a popular activity within them.

SAN FRANCISCO

Golden Gate National Recreation Area park lands in San Francisco are generally immediately adjacent to urban neighborhoods. As a result, San Francisco park sites are distinct: they are much more multimodal in terms of both access and circulation than are park sites in Marin and San Mateo counties, which are strongly oriented toward the automobile. Pedestrian, bicycle, and public transit access is generally very good. One site—Ocean Beach—is directly served by two rail transit lines. Nonetheless, the park sites do include large parking lots. Signage is good within park sites, although paths to park sites from the city are not always well marked.

Traffic and Parking

Automobile access to Golden Gate National Recreation Area park sites in San Francisco is generally good. While access to most park sites requires travel over San Francisco city streets—some of which can be quite congested during commuting hours—multiple access routes are available, and there are sizable parking lots available at almost every location.

Public Transit

In general, park sites in San Francisco enjoy the sort of frequent and extensive transit service that is rare in the national park system. All Golden Gate National Recreation Area park sites in San Francisco and the Alcatraz Island ferry are served at least indirectly by MUNI light rail, historic streetcar, cable car, or bus routes operating on headways of 20 minutes or less from early morning until late in the evening.

MUNI stops near Golden Gate National Recreation Area park sites, however, generally lack many amenities (including park-related signage or other wayfinding information), and MUNI stops near park sites such as Baker Beach often require short hikes over trails or through parking lots. MUNI vehicles are often crowded, especially at commute times, with 4.3% of morning peak period trips exceeding 125% of seating and standing capacity (San Francisco Municipal Transportation Agency 2009). Details of MUNI routes serving Golden Gate National Recreation Area park sites can be found in appendix E.

A number of changes have been planned to MUNI service that would impact access to Golden Gate National Recreation Area park sites. Some reductions in service will be implemented in response to a budget deficit, but improvements in service are also planned, such as the MUNI E-line extension. Other changes are detailed in appendix E.

Transit service to Golden Gate National Recreation Area park sites is also provided by the PresidiGo shuttle, operated by the Presidio Trust, and by Golden Gate Transit from Marin County.

Figure 23: San Francisco Transportation Network

Back of map

1 **Bicycle**

2 Bicycle access both to and within Golden Gate National Recreation Area park sites in
3 San Francisco is good. Unlike in Marin and San Mateo counties, where steep grades and
4 rough trail conditions make many routes accessible to only the most expert cyclist, San
5 Francisco park sites offer opportunities for cyclists of all skill levels.

6 Designated bicycle routes, including on-street bike lanes and, in Golden Gate Park, off-
7 street paths, connect to all Golden Gate National Recreation Area park sites in San
8 Francisco. An off-street path runs along the northern waterfront from just east of Aquatic
9 Park to the Warming Hut at Crissy Field, and from there it is a short distance to the
10 Golden Gate Bridge, which features a dedicated bike path on its west side connecting
11 cyclists to Golden Gate National Recreation Area park sites in Marin County. Additional
12 paths and lanes can be found within the Presidio, and there are several bike paths at
13 Lands End. A bike path constituting a segment of the Pacific Coast Bicycle Route runs on
14 city land along nearly the entire, three-and-a-half mile length of Ocean Beach, and there
15 are numerous bike paths within Fort Funston.

16

17 **Pedestrian**

18 The uniquely urban context of park sites within San Francisco results in much greater
19 pedestrian access than can be enjoyed at park sites in Marin and San Mateo counties.
20 Streets leading to park sites typically include sidewalks, and the only obstacles to
21 pedestrian access are distance, busy streets, and hills in some locations. However, all
22 Golden Gate National Recreation Area park sites are along the city's waterfront, and thus
23 most are at a lower elevation than the majority of pedestrian trip origins.

24 There are, however, some obstacles to pedestrian access. Fort Funston in the city's
25 southwestern corner is relatively isolated, located west of Lake Merced and across the
26 Great Highway and Skyline Boulevard from city streets. Pedestrian access to Ocean
27 Beach requires crossing the Great Highway, which is a wide, busy thoroughfare. Many
28 park areas, however, are easily accessed, such as Lands End, via a California Coastal
29 Trail promenade connecting the Cliff House area north to the Sea Cliff neighborhood.

30 Within park sites, pedestrian routes vary from sidewalks to paved paths, boardwalks, and
31 unpaved trails. Accessibility for people with disabilities is much higher here than at park
32 sites in Marin and San Mateo counties, where few paved, level paths exist.

33 Coastal Trail and Bay Trail improvements are planned as part of the Trails Forever
34 Program, a collaborative effort of the Golden Gate National Park Conservancy, the
35 Presidio of San Francisco, and the park.

36

37 **Summary**

38 San Francisco park sites, uniquely situated within an urban environment, are generally
39 connected to their surroundings by public transit and a network of streets, bike routes,
40 and sidewalks. Parking is generally available, and there are extensive trail networks
41 within the larger park area.

1 **SAN MATEO COUNTY**

2 Just as Golden Gate National Recreation Area park sites in Marin County and in San
3 Francisco share many characteristics in common that make them distinct from the park
4 sites in other counties, park lands in San Mateo County are notable in a number of ways.
5 They are generally less developed in terms of amenities, less well used (although some
6 park sites are popular with local residents), less well connected to one another, and
7 different in terms of their primary means of access. As in Marin County, private
8 automobiles are the primary mode for access to Golden Gate National Recreation Area
9 park sites in San Mateo County.

10 However, available parking at most park sites is limited, if it exists at all. The “typical”
11 Golden Gate National Recreation Area site in San Mateo County consists of open space
12 with trails of various qualities that are accessible from a trailhead, which either provides
13 limited, informal parking, or no parking at all. Some park sites are relatively remote and
14 inaccessible to pedestrians and transit users, while others are immediately adjacent to
15 suburban neighborhoods and feature many “social” or informal entrances. Bicycle access
16 is generally good, although some park sites do not accommodate cyclists and safer routes
17 are needed along much of Route 1 south of Pacifica. Finally, signs directing visitors
18 toward parks, is generally nonexistent outside of park sites.

19

20 **Traffic and Parking**

21 Auto access to San Mateo park sites is generally good, although parking at trailheads can
22 be in short supply or available only on an “informal” basis on nearby streets; also some
23 roadways experience congestion.

24 Highways 1 and 280 provide primary access to most park sites, along with Highway 35,
25 or Skyline Boulevard, which is a suburban arterial in its northern segment, near Milagra
26 Ridge, and a two-lane rural road in the south, near Phleger Estate. Highway 92, Sharp
27 Park Road, and other rural and suburban roadways also provide access to Golden Gate
28 National Recreation Area park sites. Route 1 experiences relatively high volumes of
29 traffic (California Department of Transportation 2009).

30 A segment of Route 1 between Pacifica and Montara, called Devil’s Slide, has long been
31 prone to landslides that have closed the road for periods of several months. This segment
32 is now being replaced by an inland bypass including twin tunnels and bridges. These are
33 due for completion in 2011. At that time, the existing segment of roadway will be
34 converted to a multi-use California Coastal Trail segment extending north and south to
35 connect to Golden Gate National Recreation Area and state park sites along the coastline.

36 Finally, data on both parking availability and visitation is not available. However

- 37 • At park sites in San Mateo County, parking is generally both limited and
38 informal; it is found along roadsides, in neighborhoods, in business parking lots,
39 and in at adjacent college or state park parking lots. At SFPUC Watershed
40 trailheads, parking is likewise along roadsides. However, there are more than 40
41 spaces at the southern end of the popular Sawyer Camp Trail.

1
2
3

Figure 24: San Mateo County Transportation Network

Back of map

- 1 • Access to Phleger Estate is generally through Huddart County Park, which
2 provides ample parking.

3

4 **Public Transit**

5 The San Mateo County Transit District, or SamTrans, provides bus service throughout
6 the county. As San Mateo is a relatively low-density, suburban county, much of this
7 service is relatively infrequent, operating on headways of 30 minutes to as much as 180
8 minutes, and some routes do not operate on weekends or mid-days, outside of normal
9 commuting hours. Stops generally lack amenities, and pedestrian routes from stops to
10 Golden Gate National Recreation Area park sites often lack sidewalks. However, as many
11 park sites in San Mateo County are immediately adjacent to neighborhoods, a few stops
12 are located within walking distance of Golden Gate National Recreation Area park
13 sites. In general, SamTrans provides a fair level of service to Pacifica and Montara,
14 including relatively frequent service to Mori Point and Milagra Ridge. Service to these
15 two areas also connects to BART and operates seven days a week. Service to the Sawyer
16 Camp and San Andreas trails, however, is limited to weekdays, and Phleger Estate is
17 currently not served by transit. More information on SamTrans service can be found in
18 appendix E.

19

20 **Bicycle**

21 Bicycle access to Golden Gate National Recreation Area park sites in San Mateo County
22 is mixed; however, bicycle amenities within the park are generally good, as cyclists are
23 allowed on most trails and many trails are paved, making them available to road bikes as
24 well as mountain bikes.

25 While most bicycle access to Golden Gate National Recreation Area park sites in San
26 Mateo County is over roadways without separate bicycle facilities, a grade-separated, off-
27 road bike path parallels Route 1 along the Pacifica shoreline, connecting Pacifica State
28 Beach just north of Pedro Point to Rockaway State Beach and Mori Point. Another
29 unpaved path runs north from Mori Point to Sharp Park Beach, and there are bike lanes
30 along Sharp Park Road connecting to Milagra Ridge. Cañada Road, running south from
31 the SFPUC Watershed, is closed to motor vehicles for several hours on county-sponsored
32 “Bicycle Sundays.”

33 Milagra Ridge, meanwhile, features a paved loop within the site. The popular Sneath
34 Lane Trail at Sweeney Ridge is paved, and the popular Sawyer Camp and San Andreas
35 trails in the SFPUC Watershed are primarily high capacity, paved, multi-use trails with
36 median striping and mile markers. Bicycles are prohibited on trails within the Phleger
37 Estate.

38 The *San Mateo County Bicycle Plan* proposes improvements to routes popular with
39 cyclists, including Cañada, and while improvements are not planned, a route allowing
40 bikes access from the San Mateo County suburbs east of Interstate 280 to the road and
41 mountain bike trails west of Skyline Boulevard has been identified as a priority for
42 cyclists. This could require bicycle access in the vicinity of Phleger Estate.

1 **Pedestrian**

2 Pedestrian access to Golden Gate National Recreation Area park sites in San Mateo
3 County is limited. Trailheads at a few park sites, such as Milagra Ridge, Sweeney Ridge,
4 Mori Point, Pedro Point, and Corral de Tierra, are adjacent to suburban neighborhoods
5 and thus are relatively accessible to pedestrians (although sidewalks leading to the park
6 sites are sometimes lacking). However, pedestrian circulation within San Mateo County
7 park sites is in many cases very good, as most San Mateo County park sites are
8 essentially open space preserves with trail networks. Also, two park sites, Corral de
9 Tierra and Phleger Estate, offer extensive equestrian access. Trails within San Mateo
10 County Golden Gate National Recreation Area park sites are detailed in appendix F.

11

12 **Summary**

13 San Mateo County park sites are generally adjacent to suburban developments and are
14 easily accessible by automobile . However, they are not well served by public transit,
15 which is oriented toward commuters. Bicycle access is generally good, although bikes are
16 not allowed on many trails, and hiking is popular within the parks. While more
17 discontinuous than park sites in Marin County or San Francisco, San Mateo County park
18 sites are connected in part by both the California Coastal Trail and the Bay Area Ridge
19 Trail. San Mateo park sites are also popular with equestrians.

PARK MANAGEMENT, OPERATIONS, AND FACILITIES (INCLUDING BOTH GOLDEN GATE NATIONAL RECREATION AREA AND MUIR WOODS NATIONAL MONUMENT)

5

6 STAFFING

7 The park management team and staff are responsible for both Golden Gate National
8 Recreation Area and Muir Woods National Monument. In FY2009, the park was staffed
9 by 309 full time equivalent employees (FTEs). The National Park Service staff is
10 supplemented by the staff of the Golden Gate National Parks Conservancy, numerous
11 park partners, and a large number of volunteers who fulfill critical roles within the
12 operations and programming of the park and monument.

13

14 Office of the Superintendent

15 The Office of the Superintendent includes managerial activities of the Superintendent,
16 Deputy Superintendent, Public Affairs, and Strategic Planning and Initiatives, as well as
17 administrative staffs. The Deputy Superintendent's Office is responsible for a
18 considerable portion of the park management including staff in the areas of
19 administration, business management, cultural resources and museum management,
20 interpretation and education, environmental and safety, maintenance, natural resources
21 management and science, planning and compliance, visitor resources and protection and
22 administration.

23

24 Planning, Projects and Compliance

25 The Division of Planning is an assemblage of planning, environmental review,
26 transportation, and design professionals who provide park management with the technical
27 expertise and policy guidance needed to preserve and protect the park's natural and
28 cultural resources and provide for appropriate public use. Planning staff work as a team
29 with other park divisions, park partners, and other agencies to make this mission a reality.

30 Typically, \$700 thousand to \$900 thousand worth of work is managed with a staff of 12
31 FTEs. Given the complexity of managing a large park unit adjacent to a high density,
32 urban population, the project workload into the future is substantial. Adequate planning
33 staff is critical for achieving the park's vision; maintaining positive relationships with the
34 public and meeting the high expectations set internally by the National Park Service and
35 externally by the community. The park's ability to benefit from the philanthropic
36 capacity of the Bay Area will continue to depend heavily on the park's ability to plan for
37 and manage projects and programs funded by outside sources. Current funding provides
38 about two-thirds of the needs for management and administration with the balance
39 derived from external sources.

1 **Cultural Resources and Museum Management Division**

2 The park and monument are home to a remarkable constellation of cultural resources,
3 among the most diverse in the entire national park system. This division oversees
4 management of more than 190 inventoried archeological sites (some of which predate
5 European contact and constitute the most tangible connection between the Coast Miwok
6 and Ohlone communities and park lands); more than 700 historic structures (most related
7 to military and maritime commercial themes stretching over a period of more than 200
8 years) that include 5 National Historic Landmarks, 12 properties listed in the National
9 Register of Historic Places, and 7 properties determined eligible for national register
10 listing; 9 documented cultural landscapes, including rural landscapes and dairy ranches;
11 and 4.5 million items in museum collections. The staff for this division includes
12 authorization for 15 FTEs. Volunteers are necessary to support the park staff, given the
13 large number, diversity, and significance of the park's cultural resources.

14

15 **Environmental and Safety**

16 This group is responsible for environmental protection and occupational health and
17 safety; the staff consists of seven FTEs.

18

19 **Facility Operations and Maintenance Division**

20 The Operations and Maintenance Division is responsible for ensuring the physical
21 integrity of park assets and infrastructure. Facility management includes responsibility
22 for buildings, utilities, roads, grounds, housing, and project management. The park
23 maintains 185 miles of roads, 65 miles of hiking trails, hundreds of historic buildings,
24 and water and sewer systems, which total over \$150 billion in asset value. This division
25 is staffed at 120.5 FTEs. This workforce includes electricians, gardeners, engineering
26 equipment operators, and other specialists that work to ensure the parks are safe and
27 prepared for visitors.

28 Responsibilities are divided geographically: Fort Point National Historic Site, Alcatraz
29 Island, park lands in the counties of Marin, San Francisco, and San Mateo, Muir Woods
30 National Monument, Stinson Beach, as well as by asset type: trails, roads, housing,
31 buildings, and utilities. Project management and soft dollar projects also have separate
32 groups. Nearly half of the park building square footage is occupied by park partners in
33 exchange for assuming building maintenance and other responsibilities. Further, in fiscal
34 year 2007, park volunteers provided 12,850 hours of support toward maintenance
35 projects (Are 2008 numbers available?). Despite creative approaches in supplementing
36 the work of park staff, the workload needed to maintain and support the park assets
37 exceeds the available staff resources, resulting in a significant maintenance backlog. The
38 maintenance of aging infrastructure within the park requires increasing resources and
39 results in increased operational and environmental risks. Approximately 75% of the
40 maintenance needs annually go unmet due to funding, which results in an increasing
41 backlog of deferred maintenance.

42

1 **Visitor and Resource Protection Division**

2 This group includes responsibilities for law enforcement, structural fire suppression, and
3 wildland fire control. Safety services are particularly unique within the park due to its
4 urban location, its large area, and the variety of water and land based recreation that
5 occurs within the park. This division has an overall staff of 87 FTEs. Law enforcement
6 and the U.S. Park Police are responsible for enforcing law and protecting the public's
7 safety. Law enforcement staff is organized into several geographic areas north and south
8 of the Golden Gate Bridge. Patrol operations are conducted in marked and unmarked
9 police cruisers, motorcycles, bicycles, on foot, horseback and with all-terrain vehicles,
10 although a lack of sufficient patrolling units has resulted in adverse impacts to the park's
11 resources.

12 Safety services include search and rescue, emergency medical services, and structural and
13 wildland firefighting. The structural fire department also includes paramedic support and
14 lifeguards. Wildland fires are managed by a staff of nine. The Office of Fire Management
15 monitors and responds to all wildand fires within the park and maintains an appropriate
16 preparedness level in accordance with the parks' 2006 *Fire Management Plan*. Structural
17 fires within the park and in the Presidio are handled by the Presidio Fire Department. The
18 Golden Gate National Recreation Area's Fire Management Program is part of the San
19 Francisco Bay Area Network. Fire staff based at Golden Gate National Recreation Area
20 also serve Point Reyes National Seashore, John Muir National Historic Site, Eugene
21 O'Neil National Historic Site, and Pinnacles National Monument. Professional lifeguards
22 are located at Stinson Beach and patrol units cover the 6-mile stretch of Ocean Beach.

23

24 **Interpretation and Education Division**

25 This division includes Community Outreach, Education Programs, and the Volunteers-In-
26 Parks Program, as well as providing staff for specific interpretation locations throughout
27 Golden Gate National Recreation Area and Muir Woods National Monument. The overall
28 staff is 44 FTEs. The interpretation and education division has the responsibility of
29 communicating the value and significance of the parks' resources to the public through
30 signs, exhibits, brochures, ranger-led programs, and audio tours. Interpretation programs
31 are offered at Alcatraz Island, Muir Woods National Monument, Fort Point National
32 Historic Site, Fort Funston, the Sutro District, Marin Headlands, and the Crissy Field
33 Center. A variety of special interpretive programs are also offered at other locations
34 throughout the park. Community Outreach is responsible for managing communications
35 and outreach to the local community.

36 Education Programs includes staff spread out among various locations and charged with
37 developing and presenting educational programs to the public. Park staff deliver formal
38 curriculum-based educational programs to approximately 20,000 Bay Area children
39 annually on topics including habitat restoration, invasive species, marine biology, plate
40 tectonics, geology formations, and day-to-day life at Fort Point National Historic Site, to
41 mention only a few. Volunteers-In-Parks (VIP) program manages over 14,000 volunteers
42 (VIPs) who contribute from 300,000 to 400,000 hours annually to park programs.
43 Interpretation is divided into Alcatraz Island/Fort Mason, Marin (includes Marin

1 Headlands and Muir Beach), and Southern Area (San Francisco and San Mateo
2 Counties).

3 The demand for education and interpretive programs far exceeds what the park is
4 currently able to deliver. Many valuable resources within the park and monument are not
5 interpreted due to limited staff and funding for program development. Park partners such
6 as the Golden Gate National Parks Conservancy, Bay Area Discovery Museum,
7 Headlands Institute, Marine Mammal Center, Point Bonita YMCA, and Slide Ranch
8 assist in meeting the public's demand for educational and interpretive programs;
9 however, a significant gap remains between park offerings and the public demand.

10

11 **Natural Resources Management and Sciences Division**

12 The Natural Resources Division includes responsibility for protection of a diverse array
13 of aquatic, vegetation, and wildlife resources. The park is one of the largest urban
14 national parks in the world. The recreation area's 75,398 acres of land and water extend
15 from Tomales Bay in Marin County south into San Mateo County, encompassing 75
16 miles of bay and ocean shoreline and nearshore marine environments. The park is rich in
17 natural resources; it comprises 19 separate ecosystems and is home to 1,273 plant and
18 animal species. With 80 sensitive, rare, threatened, or endangered species, the park ranks
19 fourth among all units in the national park system in the number of federally protected
20 and threatened species found within a park. In addition, Muir Woods National Monument
21 preserves one of the last remaining ancient redwood forests on the Pacific Coast and in
22 the world. This division has 16 FTEs; their work is further supported by specialists from
23 the Golden Gate National Parks Conservancy and by Volunteers-In-Parks natural
24 resource stewards. Current staffing levels prevent the park from completing the baseline
25 studies and monitoring necessary to guide the park's natural resources preservation
26 efforts in the future.

27

28 **Management, Administration and Business Services**

29 This group, with 57 FTEs, integrates operations and organizational support across the
30 park. The staff consists of personnel in Administration, Budget and Finance, Contracting
31 and Procurement, Fee Collection, Human Resources, Information Technology, Public
32 Affairs and Special Events, the Superintendent's Office, and the Office of Strategic
33 Planning. The Business Management office oversees complex contracts and partnership
34 agreements that provide key services within the parks. The complexity of park operations
35 and funding requires the budget office to track funding from over 20 different sources.

36

37 **PARTNERS AND OTHER ENTITIES**

38 The Volunteer-In-Parks program is critical to the ongoing operation of Golden Gate
39 National Recreation Area and Muir Woods National Monument. In a typical year,
40 between 10,000 and 14,000 volunteers provide in excess of 300,000 volunteer hours to
41 various programs and efforts within the park. However, due to staff limitations to manage

1 volunteer efforts, the volunteer program does not have the capacity to grow and provide
2 additional benefit to the parks.

3 As a park partner for more than 24 years, the nonprofit Golden Gate National Parks
4 Conservancy (Park Conservancy) has provided more than \$80 million in assistance to the
5 park and monument. The Park Conservancy provides support with education and
6 interpretation programs and in the protection of the park natural and cultural resources.
7 The Parks Conservancy has been instrumental in facilitating visitor enhancements
8 throughout the park, including the spectacular transformation of Crissy Field,
9 improvements to Alcatraz Island, and the successful Trails Forever program.

10 In addition to programs offered by the National Park Service, park visitors can enjoy
11 programs provided by a number of nonprofit organizations in facilities owned by the
12 National Park Service. There are many other excellent park partners who provide
13 conservation restoration and protection, environmental education, outreach programs, and
14 recreational opportunities that support the goals of the park while achieving their own
15 organization's missions.

16 Many of the parks' better known programmatic partners are located in the Marin
17 Headlands, just north of the Golden Gate Bridge. These include the Marine Mammal
18 Center, Headlands Institute, Bay Area Discovery Museum, Headlands Center for the
19 Arts, Point Bonita YMCA, and Hostelling International. Antenna Theater, Aim High,
20 and The Foundation for Deep Ecology also provide excellent programs. In San Francisco,
21 the Fort Mason Foundation oversees more than 10,000 programs serving more than 1.5
22 million park visitors annually. The Fort Mason Center houses 23 nonprofit organizations
23 and provides meeting, exhibit, recreation, and performance space in 11 historic landmark
24 buildings. (Need to check with park staff to ensure we capture all the park partners.)
25 Golden Gate continues to explore new partnerships and to perfect ways to nurture and
26 sustain them to extend ongoing collaborations.

27

28 **PARK FACILITIES**

29 The large size of Golden Gate National Recreation Area and Muir Woods National
30 Monument, in combination with the diversity of natural and cultural resources and the
31 history of land use, makes for numerous facilities to be maintained and managed. The
32 park lands contain approximately 1,150 total facilities that include buildings, trails, and
33 roads.

34 The park has been at the forefront of asset planning, and has creatively found ways to
35 adaptively reuse buildings, to lease space to park partners, and to prioritize funding
36 towards most needed maintenance and deferred maintenance. Sustainability goals are
37 being incorporated into facility and systems construction. The park has also proactively
38 worked with partners to obtain outside funding for projects.

39

40

1 **Table 11: The Golden Gate National Recreation Area Portfolio Summarized by Record**
 2 **Count for Various Asset Types**

Asset Type	NPS	Partner	Total
Road Assets	215	1	216
Trail Assets	146	1	147
Maintained Landscapes	35	1	36
Buildings	186	270	456
Housing	67	1	68
Water Systems	16	2	18
Wastewater Systems	13	2	15
Other Assets	187	4	191
Grand Total	865	282	1,147

3

4 **Utilities**

5 Utilities on Alcatraz Island are of primary concern. Electricity is generated through diesel
 6 fuel, water is brought onto the island by ferry and wastewater is removed by ferry, and
 7 water for fire protection is not adequate. The park has many improvements to utilities on
 8 the island already either underway or identified. Wastewater treatment is also a concern
 9 at Stinson Beach, as the current system is at capacity.

10

11 **Roads and Trails**

12 There are more than 85 miles of roads maintained by park staff. Currently 64 miles of
 13 trails exist within the parks. Proposals for the addition of more trails within several park
 14 areas are included in the Trails Forever Program.

15

16 **Parking**

17 In the urban context of the San Francisco Bay Area, parking is often limited. Parking at
 18 Stinson Beach, Muir Woods National Monument, and Ocean Beach all present some
 19 level of impacts to the natural environment and visitor experience. Parking often fills up
 20 quickly at Stinson Beach and Muir Woods National Monument in particular, causing
 21 visitors to try to park on narrow roads or in nearby neighborhoods, or be turned away
 22 altogether.

23

1 **Historic Facilities**

2 The majority of NPS assets at the park and monument are historic buildings. Historic
3 structures require increase operations and maintenance costs, as they continue to age.

4

5 **Park Operations, Maintenance and Public Safety Facilities**

6 Park operations, maintenance, and public safety functions are presently scattered
7 throughout the park at sites and facilities that were not intended for these uses. Staff
8 carrying out these functions have been forced to adapt to conditions that do not
9 adequately meet their space, size, function, mobility, and security requirements.
10 Maintenance and public safety operations have moved numerous times over a short
11 period, requiring staff to reprogram their operations; this has resulted in operational
12 inefficiencies. Ideally, park maintenance and public safety staff would have adequate
13 space for both personnel and facilities located with appropriate access to various park
14 units. Additionally, sheltered space for a variety of equipment is needed for equipment
15 protection and efficient operations.

16

17 **Park Maintenance Facilities**

18 For efficient operations, park maintenance staff require secured vehicle parking, ability to
19 receive cell and radio transmissions, access to arterial roads and highways for moving
20 equipment, and ideally access to transit for ease of access for staff. Many of these criteria
21 are not currently met by the existing facilities. Given the coastal climate, with its salt air
22 and blowing sand, equipment life is significantly shortened by storage outdoors or in
23 unenclosed shelters. Currently, there is inadequate enclosed storage for maintenance
24 equipment within the park.

25 In Marin County, park maintenance uses 4 modular buildings at Stinson Beach for
26 offices, a workshop, and storage. A Tennessee Valley barn is used for the storage of trail
27 maintenance supplies and is shared with the volunteer horse patrol. The Nike missile site
28 is used as a bone yard, for road maintenance operations, and for storage of fill materials.
29 Fort Baker includes a building and utilities shop and parking for vehicles and equipment.
30 Fort Cronkhite includes several buildings with space for grounds maintenance operations,
31 a sign shop, offices, and storage for various programs. A large native plant nursery is
32 located at Muir Woods. Muir Woods National Monument includes grounds maintenance
33 facilities.

34 In San Francisco County, park maintenance facilities are located at Upper Fort Mason
35 and provide space for grounds maintenance operations and administrative offices. Fort
36 Miley includes a small on-site maintenance facility, heavy vehicle repairs, office space
37 and shops on the east side in a warehouse and battery. Direct vehicle and trail access is
38 less than ideal to this facility. Fort Funston includes park maintenance support located in
39 former military structures. Additional park offices and storage are located at the Presidio
40 of San Francisco.

41

42

1 Within San Mateo County, the park’s maintenance facilities include a vehicle storage
2 shed at Shelldance nursery.

3 Muir Woods National Monument park maintenance is supported by a small office in the
4 Administration-Concession building, maintenance operations in the Old Inn, and
5 facilities at Lower Conlon Avenue. These spaces supports trail maintenance, building
6 maintenance, and office space. A native plant nursery is located at Conlon Avenue.

7 The north end of Alcatraz Island includes park operations and maintenance facilities
8 within former prison buildings.

9

10 **Public Safety Facilities**

11 Currently public safety staff shares space with other divisions throughout the park. This is
12 less than ideal since there are certain public safety functions that need to be exclusive and
13 secured. Further, efficient operation requires adequate space for training and meetings,
14 visibility to the public for reporting incidents, adequate cell and radio coverage, and
15 access to public transportation for staff. Current public safety facilities do not meet these
16 requirements in each location, and reassignment of space for public safety is desirable.

17 Within Marin County, the park’s public safety has an office at Stinson Beach that
18 provides space for law enforcement, water safety, and seasonal EMS staff , along with
19 storage. Fort Cronkhite building 1056 is the main, parkwide law enforcement office. The
20 volunteer horse patrol is located at the Tennessee Valley site and includes stables.

21 The park’s public safety office in San Francisco County includes Presidio building 223,
22 Fort Miley and Upper Fort Mason, Fort Funston, and lifeguard operations at China
23 Beach.

24 The public safety staff at Muir Woods National Monument is located in the
25 Administration-Concession building. The Alcatraz public safety office is housed in
26 Building 64, a former prison building on the north end of the island.

27

28 **Residential Facilities**

29 The park staff manages 62 park housing units totaling 62,000 square feet. Housing is
30 located in the Marin Headlands. Housing in the San Francisco Bay Area is among the
31 most expensive in the United States. Recruitment and retention of employees for both the
32 park and park partners are hindered by the expense of housing in the area and low levels
33 of park housing.

34

35 **ASSET MANAGEMENT**

36 With a large number of facilities and constrained funding, the park staff strives to address
37 the challenge of maintaining assets in acceptable condition and sustaining them over
38 time. Park staff is responsible for maintaining nearly 1,150 assets; base funding of \$5.3
39 million covers only a portion of the annual operations and maintenance (O&M)
40 requirements of \$24.6 million.

1 For the same NPS occupied and maintained assets, annual special project funding of
 2 approximately \$6.0 million covers only a small portion of its \$148.8 million in deferred
 3 maintenance backlog. If you include the park assets managed by park partners, total
 4 documented park deferred maintenance exceeds \$198.1 million.

5 In 2006, the park staff developed one of the first park asset management plans (PAMP) to
 6 describe its asset inventory, summarize its current budget, communicate funding
 7 requirements, and provide strategies to better manage assets that are essential to park
 8 operations and to high-quality visitor experiences. This document was updated in 2009 to
 9 continue to expand the asset management strategy.

10

11 **Operations and Maintenance Funding Priorities**

12 Assets maintained and managed by the park's Maintenance Division (e.g., non-partner
 13 assets) were categorized into priority levels based on a variety of factors. Those factors
 14 include the importance of the assets to the mission of the park and the recognized level of
 15 maintenance needed to keep the assets operational to suit their intended functions.
 16 Funding is then directed towards the highest priority assets, while lower priority assets
 17 will be maintained to the best level that limited available funding allows. However, even
 18 with prioritization, there remains \$2.9 million in priority band 1 and 2 assets that would
 19 remain unfunded and therefore represent the most pressing unfunded needs for operations
 20 and maintenance.

21

22 **Table 12: Golden Gate National Recreation Areas Operation & Maintenance Planned**
 23 **Funding Summary**

O&M Optimizer Priority Band	Asset Count	Base O&M Allocations	O&M Benchmarks	Percent Coverage	O&M Funding Gap
(1) Highest Priority	81	\$3,561,497	\$5,148,089	69%	\$1,586,592
(2) High Priority	133	\$1,012,566	\$2,405,661	42%	\$1,393,095
(3) Medium Priority	132	\$545,513	\$2,298,316	24%	\$1,752,803
(4) Lower Priority	290	\$200,043	\$7,987,277	3%	\$7,787,234
(5) Lowest Priority	276	\$718	\$6,781,986	0%	\$6,781,268
Totals	912	\$5,320,337	\$24,621,329	22%	\$19,300,992

} Gap for Bands 1-2
\$2,979,687

24

25

26 **Partner Assets**

27 Roughly one-half of all park buildings are affiliated with partners or concessionaires.
 28 While the park shares maintenance responsibility for many of these assets, most of the
 29 concessionaire and partner facilities are under contractual arrangements. The park asset
 30 management plan has identified some specific funding needs and issues for key park
 31 partners; with new draft maintenance plans in place, park management can now follow-
 32 up with partners to clearly communicate recommendations for best addressing needed
 33 maintenance. The goal is for the park staff to help its partners identify and address

1 maintenance needs in a way that sustains the overall asset portfolio in support of the park
2 mission.

3

4 **Removal of Assets**

5 The sheer size of the park’s asset portfolio and the challenge of maintaining all assets in
6 acceptable condition provide reason enough for park management to consider measures
7 to ‘right-size’ the portfolio. Removing assets from the portfolio is an effective way to
8 reduce the maintenance burden, and the park continues to look for the disposition of non-
9 mission facilities. Removing unneeded assets is essential to keeping the portfolio a
10 manageable size and allowing available funding to be spent on a smaller pool of assets. In
11 building the GMP alternatives, the park staff identified potential assets that could be
12 disposed of over the life of the plan. The facilities identified through this process are
13 listed (in appendix ?, based upon “common to all” writeup when that gets done.

14

15 **Addressing Deferred Maintenance**

16 Recognizing that the park cannot reasonably address all of its deferred maintenance in the
17 short run, the park has a schedule of facility projects that extends out ten years; this plan
18 addresses the highest priority assets and most critical equipment needs. The condition of
19 these more important assets will show the most rapid improvement, measured by the
20 facility condition index (FCI). If 100% of project funding were applied to critical needs
21 and projected component renewal, the park would stabilize the condition of the critical
22 components of its portfolio.

23 The GMP process has also identified deferred maintenance savings that would be
24 achieved by taking the actions proposed in the alternatives. Deferred maintenance issues
25 can be addressed through several actions recommended in the general management plan,
26 including removal, stabilization, restoration, renovation, and preservation of facilities.
27 The park is pursuing a reduction in deferred maintenance through other funding methods
28 as well, such as the use of historic leasing as a source of funds to reinvest in historic
29 structures, pursuing Federal Land and Highway Protection funds, pursuing annual special
30 project funds, using a portion of proceeds from concession franchise fee funds, and
31 dedicating some repair and maintenance funds for component renewal. The park will also
32 continue to look for opportunities to work with partners in addressing deferred
33 maintenance when updating or issuing new partner agreements.

34

35

1 **Table 13: Project Funding and Deferred Maintenance**

Type of Funding	Amount
Estimated Annual Special Project Funding	\$6.0 million
NPS Deferred Maintenance	\$148.8 million
Combined NPS and Partner Deferred Maintenance	\$198.1 million

2

3 **Sustainability**

4 In a ‘funding-constrained’ world, it is also extremely helpful for the park to identify more
5 efficient ways of operating and managing its assets. The park staff has identified goals for
6 achieving a higher level of sustainability, including managing and tracking energy
7 performance, using renewable fuels, conserving water at high use areas, documenting
8 indoor air quality, and continuing to enact best practices in waste management. The park
9 managers also recognize the need to broadly communicate sustainability goals with park
10 staff and to collaborate with park partners. These measures are opportunities for the park
11 to find cost savings and become more fiscally responsible.

12

13 **Coordination between the General Management Plan and the Park**
14 **Asset Management Plan**

15 Asset data from the park asset management plan helped to inform the development of the
16 GMP alternatives. The updates of the park asset management plan, in light of the
17 planning process for the general management plan, provide an extraordinary opportunity
18 for park managers to promote sound asset management principles, incorporate the value
19 and objectives of partnership relationships, and advance sustainability goals in a
20 coordinated manner.

21

1

PART 9: POTENTIAL ENVIRONMENTAL CONSEQUENCES

Back of divider

INTRODUCTION

1 The National Environmental Policy Act (NEPA) requires that environmental documents
2 discuss the environmental impacts of a proposed federal action, feasible alternatives to
3 that action, and any adverse environmental effects that cannot be avoided. In this case,
4 the proposed federal action would be the adoption of a general management plan for
5 Golden Gate National Recreation Area and Muir Woods National Monument. This
6 chapter analyzes the potential environmental impacts on natural resources, cultural
7 resources, visitor use and experience, the social and economic environment, and NPS
8 operations and management that could result from implementing the four alternatives.

9 Because of the general, conceptual nature of the actions described in the alternatives, the
10 impacts of these actions are analyzed in general, qualitative terms. Thus, this
11 environmental impact statement should be considered a programmatic analysis. For the
12 purposes of analysis, it is assumed that all of the specific actions proposed in the alter-
13 natives would occur during the life of the plan.

14 This environmental impact statement generally analyzes several actions, such as the
15 development of recreational facilities (including trails and trailheads), the construction of
16 facilities for visitor orientation and NPS operations, and the maintenance or restoration of
17 natural and cultural resources. If and when proposed site-specific developments or other
18 actions are ready for implementation following the approval of the general management
19 plan, appropriate detailed environmental and cultural compliance documentation would
20 be prepared. This compliance would be in accordance with the National Environmental
21 Policy Act of 1969 and the National Historic Preservation Act of 1966, both as amended,
22 and would meet requirements to identify and analyze each possible impact for the
23 resources affected.

24 This chapter begins with a description of the methods and assumptions used for each
25 impact topic. Impact analyses are organized by impact topic and then by alternative. The
26 existing conditions for all of the impact topics that are analyzed were identified in Part 8
27 of this document. All of the impact topics retained for detailed analysis are assessed for
28 each alternative.

29 The analysis of the no-action alternative (continue current management) identifies the
30 future conditions at Golden Gate National Recreation Area and Muir Woods National
31 Monument if no major changes to facilities or NPS management occurred. The three
32 action alternatives are then compared to the no-action alternative to identify the
33 incremental changes that would occur as a result of changes in park facilities, uses, and
34 management. Impacts of recent decisions and approved plans, such as those identified in
35 Part 1 of this document, are not evaluated as part of this environmental analysis, except
36 as part of cumulative impact analysis when appropriate. Although these actions would
37 occur during the life of the general management plan, they have been (or would be)
38 evaluated in other environmental documents.

39

40

1 The key impacts of each alternative are briefly summarized in tables 7 and 19 in parts 4
2 and 5 of this document. When this project is considered in conjunction with other projects
3 and actions occurring in the region, impacts can become cumulative. The discussion of
4 cumulative impacts is presented separately in “Part 10: Other Statutory Considerations.”
5

METHODS AND ASSUMPTIONS FOR ANALYZING POTENTIAL IMPACTS

1 The planning team based the impact analysis and the conclusions in this chapter mostly
2 on the review of existing literature and studies, other environmental documentation
3 completed for the park, information provided by experts in the National Park Service and
4 in other agencies, and staff insights and professional judgment. The team's method of
5 analyzing impacts is further explained below. It is important to remember that all the
6 impacts have been assessed assuming that mitigative measures will be implemented to
7 minimize or avoid impacts. If mitigative measures were not applied, the potential for
8 resource impacts and the magnitude of those impacts would increase.

9 The environmental consequences for each impact topic were identified and characterized
10 based on impact type (adverse or beneficial), intensity, context, and duration. Cumulative
11 effects are discussed in Part 10.

12 **Impact intensity** refers to the degree or magnitude to which a resource would be
13 beneficially or adversely affected. Each impact was identified as negligible, minor,
14 moderate, or major, in conformance with the definitions for these classifications provided
15 for each impact topic. Because this is a programmatic document, the intensities were
16 expressed qualitatively.

17 **Context** refers to the setting within which an impact may occur, such as the affected
18 region or locality. In this document most impacts are either localized (site-specific) or
19 parkwide.

20 **Impact duration** refers to how long an impact would last. The planning horizon for this
21 plan is approximately 20 years. Unless otherwise specified, in this document the
22 following terms are used to describe the duration of the impacts:

23 **Short term:** The impact would be temporary in nature, lasting one to three years or
24 less, such as the impacts associated with construction and/or disruption of visitor use
25 to an area of the park.

26 **Long term:** The impact would last more than one year and could be permanent in
27 nature, such as the loss of soil due to the construction of a new facility. Although an
28 impact may only occur for a short duration at one time, if it occurs regularly over a
29 longer period of time the impact may be considered to be a long-term impact. For
30 example, the noise from a vehicle driving on a road would be heard for a short time
31 and intermittently, but because vehicles would be driving the same road throughout
32 the 20-year life of the plan, the impact on the natural soundscape would be considered
33 to be long term.

34 Effects also can be direct or indirect. Direct effects are caused by an action and occur at
35 the same time and place as the action. Indirect effects are caused by the action and occur
36 later or farther away, but are still reasonably foreseeable. This document discloses and
37 analyzes both direct and indirect effects, but does not differentiate between them in the
38 discussions.

1 The impacts of the action alternatives describe the difference between implementing the
2 no-action alternative and implementing the action alternatives. To understand a complete
3 “picture” of the impacts of implementing any of the action alternatives, the reader must
4 also take into consideration the impacts that would occur in the no-action alternative.

5

6 **NATURAL RESOURCES**

7 The analysis of natural resources was based on research, knowledge of the area’s
8 resources, and the best professional judgment of planners and resource specialists, who
9 have experience with similar types of projects. The definitions for impact intensity of all
10 impact topics are included in this section under of the impact topics; additional
11 considerations used in characterizing the severity or intensity, as well as the duration, of
12 certain impact topics are also discussed.

13 Impacts are determined by comparing projected changes resulting from the action
14 alternatives (alternatives 1, 2, and 3) to the no-action alternative (continue current
15 management). For all impact topics the analysis and conclusion sections are conducted at
16 the parkwide level supported by discussion specific to the counties or to individual
17 planning areas/sites where the impacts differ from those identified at the parkwide level.
18 For example, for vegetation and wildlife, a parkwide analysis of the impacts of the
19 alternatives would appear first, followed by specific discussions for Marin County and at
20 two sites, Stinson Beach and Rodeo Valley, where impacts to vegetation and wildlife
21 differ from those described at the parkwide level. A description of the impacts at the
22 county level or at individual planning areas/sites would occur only when they differ from
23 the parkwide analysis and conclusions.

24

25 **Carbon Footprint and Air Quality**

26 The park’s contribution to global climate change is evaluated by assessing the relative
27 production of greenhouse gases (carbon dioxide - CO₂) for each of the alternatives.
28 Certain actions included in the alternatives of the plan would have an effect on the parks’
29 total greenhouse gas emissions, known as the carbon footprint. Since some of the actions,
30 such as the construction of new facilities, could increase CO₂ emissions, and other
31 actions, such as providing alternative transportation and reducing visitors’ dependency
32 on personal automobiles, could reduce CO₂ emissions, it is important to evaluate the
33 impact that these actions could have on global warming. Although the National Park
34 Service would pursue sustainable practices whenever possible in all decisions regarding
35 operations, facilities management, and development in the parks, and the parks’ focus on
36 using renewable energy is a continuation of current management trends, the changes in
37 energy consumption, energy availability, or costs compared to current conditions is of
38 interest to NPS managers and the public.

39 The analysis of the effects of the actions contained in this plan on the parks’ carbon
40 footprint is based on a comparison with existing conditions. The baseline that is used for
41 comparison is the carbon footprint of the no-action alternative, which is included in the
42 “Natural Resources – Golden Gate National Recreation Area” section of Part 8. The park

1 staff inventoried its emissions in 2006 as part of their Climate Change Action Plan using
2 the NPS and EPA Climate Leadership in Parks (CLIP) tool. The CLIP tool converts
3 emissions of various greenhouse gases into a common “metric tons of carbon equivalent”
4 unit, which provides a basis for comparison among gases and simplifies reduction
5 tracking. The conversion of a greenhouse gas to metric tons of carbon equivalent is based
6 upon how strongly that particular gas contributes to the greenhouse effect, and how many
7 tons of carbon emission would have the same effect.

8 The carbon footprint of each action alternative was calculated using the CLIP tool. NPS
9 staff input energy consumption information (gallons of diesel fuel used, kilowatt hours
10 per year, miles driven) into the CLIP tool base on assumptions made for facility use
11 (square footage of building space), NPS operations, and recreational demand. Actions
12 that had attributing emissions were assessed in comparison to existing conditions. The
13 CLIP tool produces quantitative measures of gross emissions, measured as metric tons of
14 carbon equivalent (MTCE). This data provides a measurement of the carbon footprint.
15 While the gross emissions of the alternatives are expressed numerically, the impact
16 analysis (especially for effects on park resources) is general and qualitative. Overall, the
17 goal of the analysis was to assist park managers with evaluating carbon footprint as part
18 of their decision-making process.

19 The thresholds to determine the impact intensity for carbon footprint are defined as
20 follows:

21 **Negligible:** The action would result in a change in total greenhouse gas emissions, but
22 the change would be at the lowest level of detection, or not measurable. Impacts
23 would not result in a change to local air quality.

24 **Minor:** The action would result in a slight, but detectable, change in total greenhouse
25 gas emissions. Impacts could result in a change to local air quality, but the change
26 would be so slight that it would not be of any measurable or perceptible consequence.

27 **Moderate:** The action would result in a modest change in total greenhouse gas
28 emissions, which could result in a change to local air quality.

29 **Major:** The action would result in a substantial change in total greenhouse gas
30 emissions, which could result in a change to local air quality.

31

32 **Soils and Geologic Resources and Processes**

33 The effects of the alternatives on soils and geologic resources (including shoreline and
34 coastal processes) are analyzed based on the possibility of impacts resulting primarily
35 from facility development and visitor use.

36 The thresholds to determine the impact intensity for these resources are defined as
37 follows:

38 **Negligible:** The impact is barely detectable and/or would result in no measurable or
39 perceptible changes to soils and geologic resources or processes. The effects on soil
40 character and stability, and natural shoreline or coastal processes would be slight.
41 Disruptions to geologic processes would not be perceptible.

- 1 **Minor:** The impact is slight but detectable, and/or would result in small but
2 measurable changes to soils and geologic resources; the effect would be localized.
3 There could be changes in soil character and stability in a relatively small area, but the
4 change would not noticeably increase the potential for erosion. Disruptions to natural
5 shoreline or coastal processes would be within the natural range of variability.
- 6 **Moderate:** The impact is readily apparent and/or would result in easily detectable
7 changes to soils or geologic resources; the effects would be localized. The effect on
8 soil productivity and natural shoreline or coastal processes would be apparent. The
9 potential for erosion to remove small quantities of additional soil would noticeably
10 increase or decrease. Disruptions to geologic processes are expected to be within the
11 natural range of variability, but could be perceptible in the short term.
- 12 **Major:** The impact is severely adverse or exceptionally beneficial and/or would result
13 in appreciable changes to soils or geologic resources; the effect would be regional in
14 scale. There would be a strong likelihood that erosion would remove large quantities
15 of additional soil or erosion would be substantially reduced. Disruptions to natural
16 shoreline or coastal processes are expected to be outside the natural range of
17 variability and may be permanent.

18

19 **Water Resources and Hydrologic Processes**

20 Terrestrial and freshwater resources (including stream character, water quantity and
21 quality, watershed processes, wetlands, and floodplains) are analyzed together in this
22 section because of the similarities of these resources, their interrelationship with each
23 other, and their collective effect on the overall integrity of hydrologic systems. For
24 example, terrestrial sediment inputs shape the character of streams: sediment-starved
25 streams incise, while sediment-rich streams often result in aggradation and widening.
26 Healthy riparian vegetation can also filter pollutants before reaching a creek; this in turn
27 affects water quality. In addition, many riparian areas are often classified as wetlands,
28 depending in part on their duration of saturation each year. Together, all of these
29 elements affect hydrologic processes that can influence the condition of a watershed.
30 Marine and estuarine resources/systems are discussed with a focus on water quality and
31 ocean stewardship. Although impacts to terrestrial/freshwater and marine/estuarine
32 resources and systems are discussed and analyzed separately, one conclusion is presented
33 for water resources as a whole.

34 The following impact thresholds have been developed for analyzing water resources:

35 **Negligible:** Stream character, water quality, watershed processes, wetlands, and
36 floodplains would not be impacted, or the impacts would be undetectable, or if
37 detectable, the effects would be considered slight, localized, and short-term. Any
38 measurable changes would be within the natural range of variability.

39 Any impacts to marine/estuarine water quality and ocean resources would be slight,
40 localized, and mostly inconsequential.

41 **Minor:** Impacts (chemical, physical, or biological) to stream character, water quality,
42 watershed processes, wetlands, and floodplains would be small, short-term, and
43 localized. Natural processes, functions, and integrity would be temporarily affected,

1 but would be within the natural range of variability. The impacts would only affect a
2 few individuals of plant or wildlife species dependent on one or more of these water-
3 related resources. Any changes would require considerable scientific effort to measure
4 and have barely perceptible consequences.

5 Any impacts to marine/estuarine water quality and ocean resources would be
6 noticeable and would be short-term—it would require considerable scientific effort to
7 measure and would have barely perceptible consequences.

8 **Moderate:** Impacts (chemical, physical, or biological) to stream character, water
9 quality, watershed processes, wetlands, and floodplains would be readily apparent,
10 long term, and localized. Natural processes, functions, and integrity would be
11 affected, but would be only temporarily outside the natural range of variability. The
12 impacts would have a measurable effect on plant or wildlife species dependent on one
13 or more of these water-related resources, but all species would remain indefinitely
14 viable within the parks.

15 Any impacts to marine/estuarine water quality ocean resources would be noticeable
16 and may be long term.

17 **Major:** Impacts (chemical, physical, or biological) would have drastic and permanent
18 consequences for stream character, water quality, watershed processes, wetlands, and
19 floodplains that could not be mitigated. Species dependent on one or more of these
20 water-related resources would be at risk of extirpation from the park. Changes would
21 be readily measurable, would be outside the natural range of variability, would have
22 substantial consequences, and would be noticeable on a regional scale.

23 Any impacts to marine/estuarine water quality and ocean resources would be readily
24 noticeable and long term, and would cause permanent damage or benefit.

25

26 **Habitat (Vegetation and Wildlife)**

27 Vegetation and wildlife are addressed together in this section, because an analysis of
28 potential impacts to wildlife typically involves a discussion of wildlife habitat, which
29 consists of various vegetation and aquatic communities found within the parks. Soils and
30 substrates, topography, microclimates, and landscape configuration also affect habitats,
31 but these elements are addressed in separate sections within the natural resources section
32 of the environmental consequences chapter. Threatened and endangered species
33 associated with these resources are discussed under a separate impact topic as well. The
34 effects of the alternatives on marine resources and habitat are analyzed based on the
35 possibility of impacts resulting primarily from facility development and visitor use.

36 The thresholds to determine impact intensity for these resources are defined as follows:

37 **Negligible:** There would be no observable or measurable impacts to the spatial extent
38 of native species or their habitats, or the natural processes sustaining them. There
39 would be no discernable change in native habitat integrity. Native and nonnative
40 species richness and abundance would remain the same. Impacts would be of short
41 duration and well within natural fluctuations.

- 1 **Minor:** Impacts would be detectable, but they would not be expected to be outside the
2 natural range of variability and would not be expected to have any long-term effects
3 on native species, their habitats, or the natural processes sustaining them. Any changes
4 in native habitat integrity and native and nonnative species richness and abundance
5 would be minimal.
- 6 Population numbers, population structure, genetic variability, and other demographic
7 factors for species might have small, short-term changes, but long-term characteristics
8 would remain stable and viable. Disturbance of some individuals could be expected,
9 but without interference to reproduction or other factors affecting population levels.
- 10 Key ecosystem processes might have short-term disruptions that would be within
11 natural variation. Habitat integrity would be maintained to support species' needs.
12 Impacts would be outside critical reproduction periods for sensitive native species.
13 Improvements to habitat quality may be detectable, but would not result in measurable
14 improvements in ecosystem resiliency.
- 15 **Moderate:** Impacts on native species, their habitats, or the natural processes
16 sustaining them would be detectable, and they could be outside the natural range of
17 variability for short periods of time. Population numbers, population structure, genetic
18 variability, and other demographic factors might experience short-term changes, but
19 would be expected to rebound to pre-impact numbers and to remain stable and viable
20 in the long term. Frequent responses to disturbance by some individuals could be
21 expected, with some negative impacts to feeding, reproduction, or other factors
22 affecting short-term population levels.
- 23 Breeding animals of concern are present; animals are present during particularly
24 vulnerable life-stages, such as migration or juvenile stages; mortality or interference
25 with activities necessary for survival can be expected on an occasional basis, but is not
26 expected to threaten the continued existence of the species in the parks.
- 27 Key ecosystem processes might have short-term disruptions that would be outside
28 natural variation (but would soon return to natural conditions). Habitat integrity would
29 be maintained to support species' needs. Some impacts might occur during critical
30 periods of reproduction or in key habitat for sensitive native species. Improvements to
31 habitat quality would be detectable and could result in measurable improvements in
32 ecosystem resiliency.
- 33 **Major:** Impacts on native species, their habitats, or the natural processes sustaining
34 them would be detectable, and they would be expected to be outside the natural range
35 of variability for long periods of time or be permanent. Population numbers,
36 population structure, genetic variability, and other demographic factors might have
37 large, short-term declines, with long-term population numbers significantly depressed.
38 Frequent responses to disturbance by some individuals would be expected, with
39 negative impacts to feeding, reproduction, or other factors resulting in a long-term
40 decrease in population levels. Breeding colonies of native species might relocate to
41 other portions of the park.
- 42 The impact is severely adverse or exceptionally beneficial or would result in
43 appreciable changes to wildlife resources and habitat; the effect would be regional in

1 scale. Impacts would result in a reduction in species numbers, alteration in behavior,
2 reproduction, migration, or survival. Severe adverse impacts would alter or destroy
3 habitat in a way that would prevent biological communities that inhabited the area
4 prior to the action from re-establishing themselves. These impacts are expected to be
5 outside the natural range of variability and may be permanent.

6 Key ecosystem processes might be disrupted in the long term or permanently. Loss of
7 habitat integrity might affect the viability of at least some native species.

8 Improvements to habitat quality would be detectable and permanent and would result
9 in substantial improvements in ecosystem resiliency.

10

11 **Special Status Species**

12 Federal and state listed threatened and endangered species are addressed together in this
13 section, because many of these species (1) have dual federal and state special status, (2)
14 occur together in the same habitats, or (3) would be impacted similarly under each
15 alternative. The environmental consequences for federal threatened and endangered
16 species are described in such a way that meets the requirements of the National
17 Environmental Policy Act and the Endangered Species Act (ESA). Definitions for impact
18 conclusions required for Section 7 ESA consultation are presented below:

19 **No effect:** When a proposed action would not affect a federal listed species, candidate
20 species, or designated critical habitat.

21 **May affect, not likely to adversely affect:** Effects on federal listed or candidate
22 species are discountable (i.e., extremely unlikely to occur and not able to be
23 meaningfully measured, detected, or evaluated) or are completely beneficial.

24 **May affect, likely to adversely affect:** Adverse effects to a federal listed or candidate
25 species may occur as a direct or indirect result of proposed actions and the effects are
26 either not discountable or completely beneficial.

27 **Likely to jeopardize proposed species or adversely modify proposed critical habitat**
28 **(impairment):** The appropriate conclusion when the National Park Service or the U.S.
29 Fish and Wildlife Service identifies situations in which the proposal could jeopardize
30 the continued existence of a federal listed or candidate species or adversely modify
31 critical habitat to a species within or outside park boundaries.

32 The following impact threshold definitions are used to describe the severity and
33 magnitude of changes to federal and state listed species under each of the alternatives.
34 Each threshold definition references the Endangered Species Act determinations
35 described above.

36 **Negligible:** Impacts would be imperceptible or unmeasurable (undetectable). For
37 federal listed species, this impact intensity would equate to a determination of “no
38 effect.”

39 **Minor:** Impacts would be slightly perceptible and localized in extent; without further
40 actions, adverse impacts would reverse and the resource would recover. Adverse
41 impacts may include disturbance to individuals or avoidance of certain areas.

42 Beneficial impacts would include slight increases to viability of the species in the park

1 as species-limiting factors (e.g. habitat loss, competition, and mortality) are kept in
2 check. For federal listed species, this impact intensity would equate to a determination
3 of “may affect, not likely to adversely affect.”

4 **Moderate:** Impacts would be readily measurable (apparent) and extend farther
5 geographically than a minor impact; localized in extent; adverse impacts would
6 eventually reverse and the resource would recover. Adverse impacts may include
7 disturbance, injury, or mortality of individuals, but the long-term viability of the
8 population would be maintained. For federal listed species, this impact intensity
9 would equate to a determination of “may affect, likely to adversely affect.” Beneficial
10 impacts would include increases to viability of the species in the park as species-
11 limiting factors (e.g. habitat loss, competition, and mortality) are kept in check. For
12 federal listed species, this impact intensity would equate to a determination of “may
13 affect, not likely to adversely affect.”

14 **Major:** Impacts would be substantial, highly noticeable, and affecting a large
15 geographic area; changes would be irreversible with or without active management.
16 Adverse impacts may include disturbance, injury, or mortality of individuals to the
17 point that the long-term viability of the population would be compromised. In extreme
18 adverse cases, effects would be irreversible and populations may be extirpated from
19 the park. For federal listed species, this impact intensity would equate to a
20 determination of “may affect, likely to adversely affect.” Beneficial impacts would
21 include increases to viability of the species in the park as species-limiting factors (e.g.
22 habitat loss, competition, and mortality) are substantially reduced and species
23 resilience is enhanced by greatly improving habitat integrity. For federal listed
24 species, this impact intensity would equate to a determination of “may affect, not
25 likely to adversely affect.”

26

27 **CULTURAL RESOURCES**

28 **Cultural Resources Listed in or Eligible to be Listed in the** 29 **National Register of Historic Places**

30 In this assement,environmental impacts to cultural resources are described in terms of
31 type (adverse or beneficial), context, duration (short-term, long-term, or permanent), and
32 intensity (negligible, minor, moderate, major), which is consistent with the regulations of
33 the Council on Environmental Quality (CEQ) that implement the National Environmental
34 Policy Act (NEPA). These impact analyses are intended, however, to comply with the
35 requirements of both NEPA and Section 106 of the National Historic Preservation Act
36 (NHPA). In accordance with the Advisory Council on Historic Preservation’s regulations
37 implementing Section106 of the NHPA (36 CFR Part 800, *Protection of Historic*
38 *Properties*), impacts to cultural resources were also identified and evaluated by (1)
39 determining the area of potential effects; (2) identifying cultural resources present in the
40 area of potential effects that are either listed in or eligible to be listed in the National
41 Register of Historic Places; (3) applying the criteria of adverse effect to affected, national
42 register listed or national register eligible cultural resources; and (4) considering ways to
43 avoid, minimize or mitigate adverse effects.

1 Under the Advisory Council’s regulations, a determination of either *adverse effect* or *no*
2 *adverse effect* must also be made for affected national register listed or national register
3 eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly
4 or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the
5 national register, e.g. diminishing the integrity (or the extent to which a resource retains
6 its historic appearance) of its location, design, setting, materials, workmanship, feeling,
7 or association. Adverse effects also include reasonably foreseeable effects caused by the
8 alternatives that would occur later in time, be farther removed in distance or be
9 cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). A determination of *no*
10 *adverse effect* means there is an effect, but the effect would not diminish the
11 characteristics of the cultural resource that qualify it for inclusion in the national register.

12 CEQ regulations and the National Park Service’s *Conservation Planning, Environmental*
13 *Impact Analysis and Decision Making* (Director’s Order #12) also call for a discussion of
14 mitigation, as well as an analysis of how effective the mitigation would be in reducing the
15 intensity of a potential impact, e.g. reducing the intensity of an impact from major to
16 moderate or minor. Any resultant reduction in intensity of impact due to mitigation,
17 however, is an estimate of the effectiveness of mitigation under NEPA only. It does not
18 suggest that the level of effect as defined by Section 106 is similarly reduced. Cultural
19 resources are nonrenewable resources and adverse effects generally consume, diminish,
20 or destroy the original historic materials or form, resulting in a loss in the integrity of the
21 resource that can never be recovered. Therefore, although actions determined to have an
22 adverse effect under §106 may be mitigated, the effect remains adverse.

23 A Section 106 summary is included in the impact analysis sections. The Section 106
24 summary is an assessment of the effect of the undertaking (implementation of the
25 alternative), based upon the criterion of effect and criteria of adverse effect found in the
26 Advisory Council’s regulations.

27

28 **Archeological Resources**

29 The following impact thresholds have been developed for analyzing impacts to
30 archeological resources:

31 **Negligible:** Impact is at the lowest level of detection. Impacts would be measurable
32 but with no perceptible consequences. For purposes of Section 106, the determination
33 of effect would be *no adverse effect*.

34 **Minor:** Disturbance of a site results in little loss of integrity. The determination of
35 effect for §106 would be *no adverse effect*.

36 **Moderate:** A site is disturbed but not obliterated. The determination of effect for §106
37 would be *adverse effect*.

38 **Major:** A site is obliterated. The determination of effect for §106 would be *adverse*
39 *effect*.

40

41

1 **Prehistoric and Historic Structures**

2 The following impact thresholds have been developed for analyzing impacts to
3 prehistoric and historic structures:

4 **Negligible:** Impacts would be at the lowest levels of detection – barely perceptible and
5 not measurable. There would be no change to defining features that contribute to the
6 resource’s National Register eligibility. For purposes of Section 106, the
7 determination of effect would be *no adverse effect*.

8 **Minor:** Impacts would not affect the character-defining features of a building or
9 structure listed or eligible for the National Register. Impacts would be detectable but
10 would not diminish the overall integrity of the resource. For purposes of Section 106,
11 the determination of effect would be *no adverse effect*.

12 **Moderate:** Impacts would alter a character-defining feature(s) of a significant historic
13 structure or building, and would diminish the overall integrity of the resource to the
14 extent that its National Register eligibility could be jeopardized. Mitigation measures
15 would be identified to reduce the level of impact and implemented with a high degree
16 of success. For purposes of Section 106, the determination of effect would be *adverse*
17 *effect*.

18 **Major:** Impacts would result from substantial and highly noticeable changes that
19 would alter the character-defining features of a historic structure/ building, and
20 diminish the integrity of the resource to the extent that it would no longer be eligible
21 to be listed on the National Register. Mitigation measures would be identified to
22 reduce the level of impact and adopted not knowing the degree of success. For
23 purposes of Section 106, the determination of effect would be *adverse effect*.

24

25 **Cultural Landscapes**

26 The following impact thresholds have been developed for analyzing impacts to cultural
27 landscapes:

28 **Negligible:** Impacts would be at the lowest levels of detection-barely perceptible and
29 not measurable. There would be no change to defining features that contribute to the
30 resource’s National Register eligibility. For purposes of Section 106, the
31 determination of effect would be *no adverse effect*.

32 **Minor:** Impacts would not affect the character-defining features of a cultural
33 landscape or structure listed or eligible for the National Register. Impacts would be
34 detectable but would not diminish the overall integrity of the resource. For purposes
35 of Section 106, the determination of effect would be *no adverse effect*.

36 **Moderate:** Impacts would alter a character-defining feature(s) of a cultural landscape
37 and result in measurable changes, and they could diminish the overall integrity of the
38 resource to the extent that its national register eligibility would be jeopardized. For
39 purposes of Section 106, the determination of effect would be *adverse effect*.

40 **Major:** Impacts would result from substantial and highly noticeable changes that
41 would alter the character-defining features of a cultural landscape. These impacts

1 would diminish the overall integrity of the resource to the extent that it would no
2 longer be eligible to be listed on the National Register. For purposes of Section 106,
3 the determination of effect would be *adverse effect*.

4

5 **Ethnographic Resources**

6 The following impact thresholds have been developed for analyzing impacts to
7 ethnographic resources:

8 **Negligible:** Impacts would be at the lowest levels of detection and barely perceptible.
9 Impacts would neither alter resource conditions, such as traditional access or site
10 preservation, nor alter the relationship between the resource and the affiliated group's
11 body of practices and beliefs. For purposes of Section 106, the determination of effect
12 would be *no adverse effect*.

13 **Minor:** Impacts would be slight but noticeable and would neither appreciably alter
14 resource conditions, such as traditional access or site preservation, nor alter the
15 relationship between the resource and the group's body of beliefs and practices. For
16 purposes of Section 106, the determination of effect would be *no adverse effect*.

17 **Moderate:** Impacts would be apparent and would alter resource conditions or
18 interfere with traditional access, site preservation, or the relationship between the
19 resource and the affiliated group's beliefs and practices, even though the group's
20 practices and beliefs would survive. For purposes of Section 106, the determination of
21 effect would be *adverse effect*.

22 **Major:** Impacts would alter resource conditions. Proposed actions would block or
23 greatly affect traditional access, site preservation, or the relationship between the
24 resource and the group's body of beliefs and practices to the extent that the survival of
25 a group's beliefs and/or practices would be jeopardized. For purposes of Section 106,
26 the determination of effect would be *adverse effect*.

27

28 **Museum Collections**

29 Museum collections (prehistoric and historic objects, artifacts, works of art, archival
30 documents, and natural history specimens) are generally ineligible for listing in the
31 National Register of Historic Places. As such, Section 106 determinations of effect are
32 not provided.

33 The following impact thresholds have been developed for analyzing museum collections:

34 **Negligible:** Impact(s) would be at the lowest levels of detection – barely measurable
35 with no perceptible consequences, either adverse or beneficial, to museum collections.

36 **Minor:** Impact(s) would affect the integrity of few items in the museum collection but
37 would not degrade the usefulness of the collection for future research and
38 interpretation.

1 **Moderate:** Impact(s) would affect the integrity of many items in the museum
2 collection and diminish the usefulness of the collection for future research and
3 interpretation.

4 **Major:** Impact(s) would affect the integrity of most items in the museum collection
5 and destroy the usefulness of the collection for future research and interpretation.

6

7 **VISITOR USE AND EXPERIENCE**

8 This impact analysis considers various aspects of visitor use and experience at Golden
9 Gate National Recreation Area and Muir Woods National Monument, including the
10 effects on diversity of recreation opportunities and national park experiences; visitor
11 understanding, education, and interpretation; safe and enjoyable access and circulation to
12 and within the park; and visitor safety.

13 The analysis is primarily qualitative rather than quantitative due to the conceptual nature
14 of the alternatives. Impacts on visitor use and experience were determined considering
15 the best available information. Information on visitor use and opinions were taken from
16 the public scoping information for this plan and surveys of visitors and nonvisitors
17 conducted by various researchers. Other information that was considered in the analysis
18 includes the parks' annual reporting of visitor use levels, including overnight stays, to the
19 National Park Service's Public Use Statistics Office, and local and regional travel and
20 tourism data.

21 Primarily, visitors expressed interest in preserving and educating visitors about the
22 unique natural and cultural resources of the parks, continuing to provide high quality trail
23 opportunities, exploring improved transportation and access to the park lands and
24 protecting opportunities for scenic viewing and natural quiet.

25 Impacts on visitor use and experience are described in terms of the effect on the
26 following components:

- 27 • Diversity of recreation opportunities and national park experiences
- 28 • Visitor understanding, education, and interpretation
- 29 • Safe and enjoyable access and circulation to and within the park (see also
30 transportation section)
- 31 • Visitor safety

32 The duration of a short-term impact would be less than one year to 3 years and would
33 affect only one season's uses by visitors. A long-term impact would last more than one
34 year and would be more permanent in nature.

35 Adverse impacts are those that most visitors would perceive as undesirable. Beneficial
36 impacts are those that most visitors would perceive as desirable.

37 The thresholds to determine impact intensity are defined as follows:

38 **Negligible:** Most visitors would likely be unaware of any effects associated with
39 implementation of the alternative.

- 1 **Minor:** Changes in visitor opportunities and/or setting conditions would be slight but
2 detectable, would affect few visitors, and would not appreciably limit or enhance
3 experiences identified as fundamental to the park’s purpose and significance.
- 4 **Moderate:** Changes in visitor opportunities and/or setting conditions would be
5 noticeable, would affect many visitors, and would result in some changes to
6 experiences identified as fundamental to the park’s purpose and significance.
- 7 **Major:** Changes in visitor opportunities and/or setting conditions would be highly
8 apparent, would affect most visitors, and would result in several changes to
9 experiences identified as fundamental to park purpose and significance.

10

11 **SOCIAL AND ECONOMIC ENVIRONMENT**

12 When assessing the potential impacts to the social and economic environment, several
13 impact parameters must be analyzed for each action alternative. First, the *type* of impact
14 must be determined (i.e., whether the impact is beneficial or adverse). The beneficial and
15 adverse impacts to the social and economic environment are determined by comparing
16 the anticipated changes resulting from implementing Alternatives 1, 2, and 3 to the
17 results of continuing current management (i.e., the no-action alternative). Once it is
18 determined if an impact is beneficial or adverse, the other impact attributes can be
19 assessed, such as *context*, *duration*, and *intensity*.

20 **Context:** The context refers to the setting or geographic scope of the impact to the
21 social and economic conditions. In this analysis, impacts will be measured
22 relative to the following three context levels (when applicable):

- 23 • Local gateway communities (immediate proximity to park sites)
- 24 • Three adjacent counties (Marin, San Francisco, and San Mateo)
- 25 • Bay Area (nine-county region)

26

27 **Duration:** The duration refers to the length of time the impact affects the social and
28 economic conditions. In this analysis, impact durations will be defined as
29 follows:

- 30 • **Short-term:** Impacts would be **one** year or less in duration
- 31 • **Long-term:** Impacts would extend beyond one year. Long-term impacts
32 may last for many years, or may be permanent.

33

34 **Intensity:** The intensity refers to the significance or degree of the impact to the social
35 and economic conditions. The impact intensities will be measured as
36 *negligible*, *minor*, *moderate*, and *major*. To provide a metric for quantifying
37 the intensity of the social and economic impacts, the definitions for the
38 impact intensity and thresholds are included below:

- 1 • **Negligible:** No effects occur or the effects on social and economic
2 conditions would be unnoticeable. The action would not yield any
3 noticeable or measureable changes to quality of life, the population
4 demographic, and local economy.
- 5 • **Minor:** The effects on social and economic conditions would be
6 detectable, but only slight and limited to a small portion of the
7 surrounding community and local economy. The action would minimally
8 influence the quality of life quality of life, the population demographic,
9 and/or local economy.
- 10 • **Moderate:** The effects on social and economic conditions would be
11 readily apparent and would influence multiple segments of the
12 community or local economy. The action would yield changes that are
13 noteworthy or modest to the quality of life, the population demographic,
14 and/or local economy.
- 15 • **Major:** The effects on social and economic conditions would be very
16 apparent, significant, and/or widespread throughout the community and
17 local economy. The action would yield considerable changes to the
18 quality of life, the population demographic, and/or local economy.

19 In the discussion of impacts to the social and economic environment, an analysis section
20 and conclusion section are included for each alternative for Golden Gate National
21 Recreation Area including Alcatraz Island and Muir Woods National Monument,
22 including the no-action alternative. Also, the analysis begins with a section that addresses
23 the impacts from actions that are common to all action alternatives for both Golden Gate
24 National Recreation Area and Muir Woods National Monument. To help with assessing
25 impacts to the social and economic environment, the planning team considered the
26 following primary and secondary factors that collectively affect the social and economic
27 environment of the project area.

28

29 **TRANSPORTATION**

30 Planning alternatives for the Golden Gate National Recreation Area and Muir Woods
31 National Monument were developed for park lands in San Mateo, Marin, and San
32 Francisco counties. For each of the three counties, as well as for Alcatraz Island and Muir
33 Woods National Monument, the proposed alternatives are discussed with respect to their
34 qualitative effect on visitor access and circulation related to roadways, parking, bicycle
35 access, pedestrian access, transit service, and access to transit. Muir Woods National
36 Monument has been the subject of more detailed transportation analysis in recent years,
37 enabling this section to include more quantitative analysis than the other areas.

38 Transportation impacts for the no-action alternative plus the three action alternatives are
39 discussed for park lands in each of the following geographic areas

- 40 • Marin County – southeast coastal area, southwest coastal area, Marin Headlands,
41 and the Stinson Beach area

- 1 • San Francisco – Upper Fort Mason, China Beach, Lands End, East and West Fort
2 Miley, Ocean Beach, and Fort Funston.
- 3 • San Mateo County – multiple sites
- 4 • Alcatraz Island
- 5 • Muir Woods National Monument
- 6 No significant changes in the amount of parking available (formal or informal) is
7 anticipated at sites covered by this analysis, with the exception of the Muir Woods
8 National Monument alternatives, and one alternative for Stinson Beach. Other than
9 continuing and expanding shuttle service to Muir Woods National Monument, changes in
10 transit service that would be provided by agencies other than the National Park Service,
11 are not modeled.
- 12 Impacts on visitor access and on the transportation system are described in terms of their
13 effect in the following areas, as applicable:
- 14 Visitor Connections to Park Sites and Communities
- 15 • Access by land, including roads, public transit, trails, and the implementation of
16 advanced traveler information systems
- 17 • Access by water, including ferries, water taxis, or other water transit
- 18
- 19 Functionality of the Transportation System
- 20 • Land transportation, including traffic flow and circulation, parking availability,
21 transit service availability, transit facility capacity, amenities and condition, and
22 public health and safety
- 23 • Water, including facility capacity and condition, multimodal access and public
24 health and safety
- 25 • Connectivity, including number and capacity of connections, and availability of
26 modes of travel
- 27
- 28 For this analysis, equestrian activity is considered recreational and is not included as part
29 of the transportation system.
- 30 The thresholds to determine impact intensity are defined as follows:
- 31 **Negligible:** Most visitors would likely be unaware of any effects associated with
32 implementation of the alternative.
- 33 **Minor:** Changes in visitor access/circulation would be slight but detectable, would
34 affect few visitors, and would not appreciably limit or enhance visitors’ ability to visit
35 park sites or navigate within park sites.

1 **Moderate:** Changes in visitor access/circulation would be noticeable, would affect
2 many visitors, and would result in some changes to visitors' ability to visit park sites
3 or navigate within park sites.

4 **Major:** Changes in visitor access/circulation would be highly apparent, would affect
5 most visitors, and would result in several changes to visitors' ability to visit park sites
6 or navigate within park sites.

7 Four terms are used to describe the seasonality of transportation impacts:

8 **Peak season:** the impact would occur primarily from Memorial Day through Labor
9 Day

10 **Shoulder season:** the impact would affect transportation in April and May in the
11 spring, and in September in the fall

12 **Low visitation of Off-season:** the impact would occur primarily from October 1
13 through April 30

14 **Year-round:** The impact would affect visitor experiences for much of the year,
15 especially if adverse effects during peak months had the effect of spreading visitation
16 more evenly

17

18 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

19 The impact analysis evaluated the effects of the alternatives on Golden Gate National
20 Recreation Area and Muir Woods National Monument operations, including staffing,
21 infrastructure, maintenance, visitor facilities, and services.

22 The analysis focused on how operations and facilities might vary with the different
23 management alternatives. The analysis is qualitative rather than quantitative because of
24 the conceptual nature of the alternatives. Consequently, professional judgment was used
25 to reach reasonable conclusions as to the intensity, duration, and type of potential impact.

26 The following impact thresholds have been developed for analyzing park management,
27 operations, and facilities:

28 **Negligible:** The effect would be at or below the lower levels of detection, and would
29 not have an appreciable effect on park operations and management

30 **Minor:** The effects would be detectable, but would be of a magnitude that would not
31 have an appreciable effect on park operations and management.

32 **Moderate:** The effects would be readily apparent and would result in a change in park
33 operations and management in a manner noticeable to staff and the public.

34 **Major:** The effects would be readily apparent and would result in a substantial change
35 in park operations and management in a manner noticeable to staff and the public. The
36 change would produce conditions that would be markedly different from existing
37 operations.

IMPAIRMENT OF PARK RESOURCES

1 In addition to determining the environmental consequences of implementing the alterna-
2 tives, *NPS Management Policies 2006* (section 1.4) requires analysis of potential effects
3 to determine whether alternatives would impair the parks' resources and values.

4 The fundamental purpose of the national park system, established by the Organic Act and
5 reaffirmed by the General Authorities Act, as amended, begins with a mandate to
6 conserve resources and values. NPS managers must always seek ways to avoid, or to
7 minimize to the greatest degree practicable, adverse impacts on resources and values.
8 Although Congress has given the National Park Service the management discretion to
9 allow certain impacts within a unit, that discretion is limited by the statutory requirement
10 that the National Park Service must leave resources and values unimpaired unless a
11 particular law directly and specifically provides otherwise.

12 The prohibited impairment is an impact that, in the professional judgment of the
13 responsible NPS manager, would harm the integrity of resources and values, including
14 the opportunities that otherwise would be present for the enjoyment of those resources or
15 values (*NPS Management Policies 2006* section 1.4.5). An impact would be more likely
16 to constitute impairment if (1) it results in a moderate or major adverse affect on a
17 resource or value whose conservation is necessary to fulfill specific purposes identified in
18 the establishing legislation or proclamation of the area; (2) key to the natural or cultural
19 integrity of the area or to opportunities for enjoyment of the area; or (3) identified as a
20 goal in the area's general management plan or other relevant NPS planning documents.

21 A determination on impairment is made in the "Conclusion" section for each required im-
22 pact topic related to the parks' resources and values. An evaluation of impairment is not
23 required for topics related to visitor use and experience (unless the impact is resource
24 based), the social and economic environment, or NPS operations. When it is determined
25 that an action or actions would have a moderate to major adverse effect, an explanation is
26 presented of why this would not constitute impairment. Impacts of negligible or minor
27 intensity would not, by definition, result in impairment. The impairment analysis for each
28 of the impact topics, found later in this chapter, has determined that none of the
29 alternatives presented in this plan would result in impairment of park resources.

30

ENVIRONMENTAL IMPACTS COMMON TO ALL ACTION ALTERNATIVES AT GOLDEN GATE NATIONAL RECREATION AREA AND MUIR WOODS NATIONAL MONUMENT

5

6 **NATURAL RESOURCES**

7 **Analysis**

8 The goals and strategies that are common to all action alternatives include policy
9 guidance on a variety of topics that would have an impact on natural resources. These
10 topics include park boundaries, climate change, ocean stewardship, partnerships,
11 Redwood Creek vision, Sharp Park, transportation, trails, and museum collections. In
12 general, all of the guidance that is included would have a beneficial impact on natural
13 resources.

14 For example, the park boundaries policy contains goals for science-based land and water
15 acquisition that would improve the integrity of natural resources. It also includes the
16 proposed acquisition of several parcels of land and water in San Mateo County as well as
17 potential future boundary adjustments across the park.

18 The policy on climate change includes goals for greenhouse gas emissions reductions and
19 responding to the effects of climate change on natural resources. The management
20 approach that is included seeks to reduce environmental stressors, maintain biological
21 diversity, and develop adaptation responses to build resiliency in natural systems and
22 species.

23 The ocean stewardship policy includes management strategies and objectives that would
24 help to protect ocean resources through improved research and collaborative management
25 with other state and federal agencies.

26 The partnerships policy would assist the NPS in developing collaborative arrangement
27 with other park partners whose programs have shared goals including preservation of
28 natural resource management.

29 The Redwood Creek vision includes guiding principles and desired future conditions for
30 natural resource protection and management of the entire Redwood Creek watershed,
31 which would assist the NPS in meeting its management goals at Golden Gate National
32 Recreation Area and Muir Woods National Monument.

33 The Native American engagement policies could have minor, adverse impacts on
34 vegetation and wildlife impacts due to the collection of natural materials. Coordination
35 between Native Americans and park staff would ensure that habitat integrity would be
36 maintained.

37 The Sharp Park policy includes guidance and criteria for the potential future acquisition
38 of Sharp Park by the NPS. The policy would ensure that habitat for the federally listed

1 California red-legged frog and the San Francisco garter snake would be protected, in
2 addition to providing habitat for other wildlife and plant species and the potential to
3 connect to a large habitat corridor.

4 The transportation policy includes goals for multi-modal and alternative transportation,
5 which would assist the NPS in reducing its carbon footprint and air quality concerns in
6 the Bay area.

7 The trails policy includes goals on sustainable trail design and best management
8 practices, which would assist the NPS in improving habitat quality and integrity by
9 reducing impacts from erosion, exotic and invasive species, and habitat fragmentation.

10 The museum collections policy would benefit natural resources by ensuring that natural
11 resource specimens (whether geologic, botanical, etc.) are properly protected and
12 managed.

13

14 **Conclusion**

15 Overall, impacts to natural resources resulting from these policies would be long term,
16 beneficial, and would range from negligible to moderate, throughout Golden Gate
17 National Recreation Area and Muir Woods National Monument.

18

19 **CULTURAL RESOURCES**

20 **Analysis**

21 Inclusion of the San Mateo County properties (Gregerson Property adjacent to Rancho
22 Corral de Tierra, Vallemar Acres, and Highway Frontage in the West Cattle Hill vicinity)
23 and potential future boundary adjustments (the Marin City Ridge, Pacifica Conservation
24 Area, Montara Mountain Complex, San Mateo County gateway, and Bolinas Lagoon)
25 that could create additions to Golden Gate National Recreation Area, would result in
26 enhanced identification, evaluation, protection, and preservation of archeological
27 resources, historic structures, and cultural landscape values in those areas per National
28 Park Service cultural resource policies.

29 Implementation of the park's climate change policy and action plan would result in (1) an
30 understanding of how to protect and preserve the park's archeological resources, historic
31 structures, and cultural landscapes by reducing current stressors to such resources, (2)
32 assisting in development of triage criteria for prioritizing preservation treatments and
33 other management actions for cultural resources, such as relocation coupled with
34 sustainable mitigation efforts for shoreline resources, and (3) guiding managed retreat
35 programs when the triage process indicated that preservation treatment or relocation was
36 not the most prudent option.

37 Establishing a curatorial and research facility that meets NPS standards and can
38 accommodate all of the park's museum collection will have a long-term beneficial impact
39 to the preservation of the collections. Strengthening the collection policy and
40 implementing actions to connect people with the park's museum will have a beneficial

1 impact by increasing public stewardship opportunities, access to the park's history, and
2 integration of the museum collections into the park's visitor experience.

3 Implementation of the park's Ocean Park Stewardship Policy would result in improved
4 identification, understanding, protection, and preservation of the park's archeological
5 (i.e., submerged) resources.

6 Although development of new or improved maintenance hubs, a public safety hub, and
7 satellite maintenance offices could result in some minor adverse effects on the park's
8 archeological resources, historic structures, and cultural landscapes, every effort would
9 be made to establish these functions in existing developed areas or in rehabilitated
10 historic buildings whose architectural values are protected and preserved. In addition,
11 improved maintenance facilities and programs would enable the park to conduct more
12 comprehensive cultural resource preservation and maintenance programs and thus
13 enhance protection of the park's cultural resource values.

14 Ongoing National Park Service efforts to establish and foster effective partnerships
15 would result in beneficial impacts on the park's archeological resources, historic
16 structures, and cultural landscapes because partnerships (1) create appreciation and
17 support for the park's resources and (2) increase avenues through which communities and
18 visitors can engage with the park to preserve and enhance those resources.

19 Implementation of the Redwood Creek Vision would result in enhanced collaborative
20 efforts to identify, protect/preserve, and interpret archeological resources, historic
21 structures, and cultural landscapes in the Redwood Creek watershed.

22 Potential future resource management support by the National Park Service in the Sharp
23 Park area could potentially result in identification, evaluation, and enhanced preservation
24 of archeological resources, historic structures, and cultural landscapes.

25 Continued transportation planning for the park would result in better protection and
26 preservation of cultural resources and related values (e.g., cultural landscapes) by
27 minimizing transportation impacts, providing for a high quality visitor experience, and
28 improving safety and facilitating access/circulation to and within the park.

29 Although expanding the park's trail system and improving its connectivity and
30 accessibility could have adverse impacts on the park's archeological resources and
31 cultural landscapes, although with sustainably designed, strategically located, and
32 systematically maintained trails would also generally contribute to the protection and
33 preservation of such resources.

34 Ongoing and enhanced Native American engagement programs and protocols by the park
35 with the Federated Indians of Graton Rancheria and Ohlone tribes and individuals would
36 result in improved cultural resource management of archeological and ethnographic sites,
37 collaborative interpretation and education activities, and revitalization of Native
38 American communities, traditions, and heritage.

39 Additionally, improving ferry access to Alcatraz and establishing ferry routes to other
40 park sites within San Francisco Bay would result in better preservation of the cultural
41 resources by minimizing transportation impacts to its cultural landscape values.

1 Implementation plans for Alcatraz, such as preparation of a cultural landscape report,
2 historic resource study, and baseline inventory and HABS recovery plan, would provide
3 the National Park Service with the knowledge to better preserve and more effectively
4 interpret the multiple layers of historic development associated with the island's
5 significant archeological resources, ethnographic sites, historic structures, and cultural
6 landscapes.

7

8 **Conclusion**

9 Actions common to all action alternatives would generally have beneficial impacts on the
10 protection and preservation of archeological resources, ethnographic sites, historic
11 structures, and cultural landscapes in Golden Gate National Recreation Area including
12 Alcatraz Island.

13 Concerning the actions common to all action alternatives, the Section 106 determination
14 of effect on archeological resources, ethnographic sites, historic structures, and cultural
15 landscapes in Golden Gate National Recreation Area including Alcatraz Island is *no*
16 *adverse effect*.

17

18 **VISITOR USE AND EXPERIENCE**

19 **Analysis**

20 In addition to the specific proposals in the action alternatives, some of the
21 recommendations and policies that are common to all action alternatives would have a
22 beneficial impact on visitor use and experience at both Golden Gate National Recreation
23 Area and Muir Woods National Monument. Several of the proposed boundary
24 adjustments would provide new lands for recreation and access purposes that would have
25 a beneficial impact on visitor use and experience by expanding the diversity of settings
26 offered or facilitating better access options to various park sites. The recommendations
27 for educating visitors on climate change and ocean stewardship would have a beneficial
28 impact on visitor experience by providing visitors with direct access to the latest research
29 and knowledge, providing increased awareness and inspiration regarding these important
30 subjects. Actions that improve the preservation and visitor access to the museum
31 collection would strengthen the park's interpretive and education programs. The new
32 public safety office proposed at Sheldance Nursery would have a beneficial impact on
33 visitor safety by providing shorter response times and a constant NPS presence in the
34 southern portion of the national recreation area. The partnership strategy will ensure that
35 NPS partnerships continue to serve the needs of visitors with high quality services,
36 facilities and opportunities. If the park ends up owning or managing portions of Sharp
37 Park contiguous to GGNRA-managed lands, visitors would benefit from additional trail
38 based recreation and educational opportunities. These actions would have a long-term,
39 moderate beneficial impact on the visitor experience to the park.

40 The transportation strategy emphasizes the goal of providing sustainable, multi-modal
41 access to all many park sites, which would benefit visitors by reducing traffic congestion
42 and use conflicts, and facilitating more efficient access to and between park sites. Finally,

1 the trails strategy emphasizes the goal of providing an enduring trail system that serves as
2 a sustainable network of access within and between park sites. Trails provide one of the
3 most important ways that visitors experience and enjoy the park and discover its diverse
4 settings, so providing a long-term strategy to perpetuate a coordinated and sustainable
5 system will be a long term, moderate, beneficial impact to the visitor experience.

6

7 **Conclusion**

8 The recommendations and policies that are described in the actions common to all action
9 alternatives will have a long-term, moderate, beneficial influence on the visitor
10 experience at the park. Visitors would be provided enhanced access throughout the park
11 by improved trails and transportation systems, increased opportunities for interpretation
12 and education supported by the parks museum collection and new programs related to
13 climate change and ocean stewardship. Strengthening the park partnership programs and
14 preservation of park resources by potential expansion of park boundaries and increased
15 public safety efforts would contribute to improvements to the visitor experience.

16

17 **SOCIAL AND ECONOMIC ENVIRONMENT**

18 **Analysis**

19 In terms of transportation improvements, actions that are common to all alternatives
20 would pursue multi-modal transportation access opportunities to additional park sites.
21 One example of this pursuit is the NPS collaboration with the Water Emergency
22 Transportation Authority (WETA) in developing multiple park access points to this Bay
23 Area ferry system (e.g., between Fort Baker, Fort Mason, and the Presidio and potentially
24 other park sites). Additional public transportation opportunities for residents of the Bay
25 Area community to access Golden Gate National Recreation Area park sites, could
26 improve the quality of life in the area since more residents would be able to visit the park
27 to exercise, enjoy the natural coastal settings, participate in outdoor recreational
28 activities, educational and stewardship programs, or simply have a place to escape the
29 urban environment. As a result, this regional transportation effort could result in an
30 impact that is long-term, moderate, and beneficial for the local gateway communities and
31 adjacent counties, while being long-term, minor, and beneficial for the Bay Area region.

32 Similarly, all alternatives would pursue improvements to the existing park trail systems
33 and to better link trails to local communities and with the larger regional trail network. In
34 addition, extensive efforts will be made to developing a trail system on park lands within
35 San Mateo County and thereby provide users with new opportunities to access a larger
36 trail network with connections to trails on other public lands. Expanded regional trail
37 network and improved accessibility to parklands would contribute to the quality of life
38 for residents in these gateway communities. As a result, these trail connection actions
39 could yield impacts that are long-term, minor to moderate, and beneficial for the local
40 gateway communities and adjacent counties.

41 In addition, a comprehensive education and stewardship program would be developed to
42 engage the public in natural and cultural stewardship issues and educate them about park

1 resources and the threats to their preservation. With more and more residents of the
2 community becoming more aware and engaged in these important issues, communities
3 could benefit as residents and organizations take actions that move toward sustainability,
4 decrease waste and pollution, and other measures that could contribute to improvements
5 to the community's quality of life. This education and stewardship effort would be
6 pursued in all alternatives, resulting in an impact that could be long-term, minor, and
7 beneficial in the context of the local gateway communities and three adjacent counties.

8 As for community outreach, all actions that are common to all alternatives would
9 continue to improve the National Park Service's efforts at maintaining a healthy and
10 productive relationship with Native American communities in the area. Reaching and
11 engaging the diverse segments of the regional population is critical to the future success
12 of park management. These efforts would codify and continue the park's policy to work
13 with Coast Miwok and Ohlone communities in activities related to cultural resource
14 management, interpretation and education, and the revitalization of community and
15 tradition. This effort to maintain and improve communication with the Native Americans
16 in the region would be pursued in all alternatives, resulting in an impact that would be
17 long-term, minor, and beneficial for the local gateway communities, adjacent counties,
18 and the Bay Area as a whole.

19 Lastly, actions common to all alternatives maintain a strong commitment to park
20 partnership development as a tool for park programs, preservation activities, developing
21 community engagement in park issues while also contributing to the success of the park
22 partner organizations and agencies. All alternatives will aim at being proactive in
23 identifying partnership opportunities, developing win-win partnerships, being innovative,
24 sharing the vision of the partnership, maintaining clear expectations, and committing to
25 actively managing the partnerships. For the National Park Service, this commitment
26 would provide a cost-effective way to enhance park services, improve visitor
27 opportunities, and engage the community. For the various partners, this commitment
28 would help build and expand organization success and outreach. This collaboration effort
29 would be maintained and improved in all alternatives, resulting in an impact that would
30 be long-term, moderate, and beneficial for the local gateway communities. The impact
31 would be long-term, minor, and beneficial for the three adjacent counties.

32 In addition to the above actions described in the section "Actions Common to All
33 Alternatives," each alternative also includes a proposed action that would ultimately close
34 the Sheldance Nursery (a modest commercial operation in San Mateo County). This may
35 be considered an adverse impact to quality of life for some community members who
36 have actively visited the nursery in the past. In addition, this closure could be considered
37 an adverse impact to local economy due to job loss, sales tax revenue loss, and the loss of
38 the multiplier effect of the business monies and its employee salaries. The collective
39 result would be an impact that is long-term, minor, and adverse for the local gateway
40 communities. The impact to the three adjacent counties would be negligible.

41

42 **Conclusion**

43 The overall impact to the social and economic environment from actions that are
44 common to all alternatives could be long-term, minor to moderate, and beneficial with an

1 affected area that ranges from the local gateway communities to the overall Bay Area.
2 The beneficial impacts would result from the policies and guidance for boundary
3 changes, climate change, ocean stewardship, museum collections, and Redwood Creek
4 vision. The improved parkland accessibility via multi-mode transportation and trails
5 would improve access and linkages to a regional network. The park staff commitments to
6 the Native American community and park partners increase the connections and
7 opportunities in preserving park resources and providing visitor opportunities. All these
8 actions contribute to improving the quality of life and local economy.

9 The closure of Shelldance Nursery would have a long-term, minor, adverse impact to the
10 local gateway community.

11

12 **TRANSPORTATION**

13 **Analysis**

14 ***Marin County***

15 All action alternatives for Marin County include the following transportation measures:
16 In the southeast coast area (Rodeo Valley / McCullough and Conzelman Road) facilities
17 at Kirby Cove would provide visitors with access to the beach and new San Francisco
18 Bay Water Trail. In the southwest coast area (Muir Beach to Point Bonita) beach and trail
19 access to Muir Beach would be improved while preserving the area's natural setting.
20 Regional trail connections would be enhanced. Where possible, trail improvements would
21 connect to the California Coastal Trail. Highway 1 and Panoramic Highway would be
22 managed to enable visitors traveling by car, bicycle, and cumulatively, these measures
23 would provide a long-term, minor to moderate, beneficial effect on visitor access to the
24 park through improved trails.

25 At Stinson Beach, the park staff would explore ways to improve visitor access to the
26 beach, such as continuing to increase transit on weekends during the peak season.
27 Increased transit would reduce congestion, minimize impacts on natural resources, and
28 provide a way to get to the beach without a car. A new and increased transit service could
29 also reduce parking demand within park locations, increasing it at transit access points
30 adjacent to or outside of parklands. Increased transit would yield a long-term, moderate,
31 beneficial impact in increasing the number and capacity of connections and availability of
32 non-auto modes of travel.

33 The park staff would also continue to work with the community and Marin County to
34 manage parking and reduce traffic in Stinson Beach using congestion management tools.
35 In the developed beach area, the parking lot would be replaced by a more sustainable
36 parking facility. This would have a long-term, minor to moderate, beneficial effect on
37 visitor access to the park, depending on the success of the congestion management
38 efforts.

39 Park managers would work with Marin County and state parks to explore realignment of
40 Muir Woods Road to reduce impacts to Redwood Creek. A realignment of Muir Woods
41 Road would have a short-term, moderate, adverse effect on access to the monument for
42 the duration of construction activities.

1 ***San Francisco County***

2 All action alternatives for San Francisco County include the following transportation
3 measures:

4 Trails would be improved to China Beach and Fort Funston. Safer and more direct
5 vehicle and trail access to East Fort Miley would be created. Creation of a small overlook
6 at Black Point (near Aquatic Park) would allow access to this small part of the Sensitive
7 Resources management zone. The trail system in Lands End would be improved to
8 provide access to the shoreline and vistas, as well as connections to the community and
9 adjacent park areas. All of the above measures, both individually and cumulatively,
10 would result in a long-term, minor, beneficial impact on circulation both to and within
11 these park areas.

12 At Upper Fort Mason the visitor circulation and wayfinding improvements would be
13 implemented in response to new adjacent bus transit and ferry connections. This would
14 have a long-term minor beneficial impact on connecting people arriving by transit to this
15 site.

16 At Ocean Beach the park would collaborate with the City of San Francisco to enhance the
17 Ocean Beach corridor with improved amenities including improved parking facilities.
18 This may have a long-term, minor, beneficial impact on the transportation system by
19 increasing parking availability.

20 ***San Mateo County***

21 All action alternatives for San Mateo County would include improvements to connect
22 park lands to local communities, improve trails between and within park sites, and add
23 some parking to select trailheads. Specific common improvements include new or
24 improved trails would be provided along the beach, dunes, and cliffs extending from San
25 Francisco's Ocean Beach south to Mussel Rock. Modest visitor access facilities (trails,
26 trailheads) to beaches, scenic overlooks, and along the California Coastal Trail between
27 Thornton State Beach to south of Mussel Rock. Possible trail improvement at Milagra
28 Ridge could include connections to Oceana Boulevard, the Pacific coast, Skyline
29 Boulevard, and Sweeney Ridge. The Shelldance Nursery site would transition from a
30 commercial nursery to an area providing a variety of visitor services including possible
31 enhanced trailhead parking serving Sweeney Ridge and Mori Point. Access from
32 Highway 1 and the trail connection to Mori Point would be improved. The developed
33 portion of Picardo Ranch would see trailhead improvements and some increase in
34 parking.

35 If Pedro Point, Devil's Slide, and San Pedro Mountain are acquired, they would be
36 managed to continue access improvements initiated by the community. Trailheads and
37 trails would be developed and enhanced to improve accessibility and connections to the
38 California Coastal Trail and adjacent public lands.

39 From Phleger Estate, trail connections to adjacent lands and the regional trail system
40 would be pursued in collaboration with San Mateo County and San Francisco Public
41 Utilities Commission. These connections would include the Bay Area Ridge Trail and a
42 potential multi-use trail connection between Cañada Road and Skyline Boulevard north
43 of Phleger Estate.

1 All of the above measures would provide, individually and cumulatively, a long-term,
2 minor to moderate, beneficial effect on accessibility of these remote sites by trails
3 connected to neighborhoods and to larger regional trails. Long-term, minor, beneficial
4 effects would be gained through slightly increasing parking at Sheldance and Sweeney
5 Ridge.

6

7 **Conclusion**

8 Throughout Golden Gate National Recreation Area, there would be long-term, minor to
9 moderate, beneficial effects on visitor connections to the park sites by land through
10 improved and enhanced trail systems. The potential to increase the transit frequency to
11 park sites in Marin and San Mateo counties would have a long-term, minor to moderate,
12 beneficial impact on connectivity by transit. In San Francisco and San Mateo counties,
13 there would be a long-term, minor to moderate, beneficial enhancement of transportation
14 functionality through slightly increased parking. In Marin County, parking management
15 tools, in connection with increased transit services, could result in a long-term, moderate,
16 beneficial effect on improving access to Stinson Beach, especially for those who do not
17 have access to a car.

18

19 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

20 **Analysis**

21 There are many proposed changes identified in the “actions common to all actions
22 alternatives” section that would influence park management, operations, and facilities.
23 While designed to contribute to the protection of resources and the enhancement of
24 visitor opportunities, the proposed changes will achieve these ends only if staffing and
25 operating funds are increased in accordance with the cost estimates identified for each
26 alternative. If funding and needed staffing levels are not made available when these
27 actions are implemented, the following proposed actions would have long-term,
28 moderate, adverse effects on park operations:

- 29 • Proposed boundary changes: Currently staff is unable to meet all of the needs of
30 the existing land base. Additional land will require a substantial increase in the
31 number of park staff and an increase in facility management funds.
- 32 • Implementation of the climate change policy and the Ocean Stewardship
33 Program: These changes would require additional staff and funds for baseline
34 information, monitoring, and adaptive management actions; new infrastructure
35 for alternative energy production (although some of these initial costs would
36 result in lower costs in the long run); and additional funding and staff to
37 implement the education aspect of these programs.
- 38 • Transportation goals and trail planning and development: water shuttle, ferry,
39 Bay Trail, and E-Line proposals would require extensive inter-agency
40 collaboration and potential development related to access; these actions would
41 require additional long-term staffing and funding increases. The park’s trail goals

- 1 also would require increased staffing, coordination with partners, and funding for
2 trails.
- 3 Many of the proposed changes identified in the “actions common to all actions
4 alternatives” would address many of the problems associated with operations and
5 maintenance and thereby have a positive, long-term, minor to moderate, beneficial effect
6 on park management, operations, and facilities:
- 7 • The removal of facilities not contributing to the mission of the park would have a
8 long-term, minor to moderate, beneficial effect on park operations. While
9 removal of properties would require additional staff time during demolition, the
10 long-term effect would be a reduced need for maintenance and other staff
11 attention.
 - 12 • Implementation of the museum collections policy, and particularly the
13 introduction of a curatorial and research facility for museum collections at the
14 Presidio, would benefit park operations. Collections would be consolidated from
15 15 current locations, improving access for both park staff and the public.
16 Development of the proposed museum collection facility would result in long-
17 term, moderate, beneficial impact to park operations.
 - 18 • The proposed new maintenance hubs at Capehart and in the Presidio of San
19 Francisco would allow for reuse of existing buildings and would consolidate
20 some maintenance needs. This would achieve noticeable efficiencies. On the
21 other hand, the Capehart location has a potential to conflict with neighboring
22 housing structures and would also cause the loss of some of the park housing
23 units. Development of the maintenance hubs would result in long-term,
24 moderate, beneficial impacts to operations.
 - 25 • The establishment of a public safety hub at Fort Baker would allow for faster
26 multi-agency response to locations north of the Golden Gate Bridge. The hub
27 would allow for reuse of a building and would meet space, size, function,
28 mobility, and security requirements not currently met by available facilities.
29 Development of the public safety hub would result in long-term, moderate,
30 beneficial impacts to park operations.
 - 31 • The park’s commitment to working with partners would have a continued impact
32 on the park’s ability to complete projects and programs in all areas of park
33 operations. Facility rehabilitation and restoration, and even maintenance, could
34 not be accomplished at the current level without partner funding and volunteer
35 efforts. This continued commitment would result in long-term, moderate,
36 beneficial impacts to the operations of the park.
 - 37 • Co-locating offices with San Mateo County would improve efficiencies in
38 interpretation and education as well as facility use. Co-located offices would
39 provide a long-term, moderate, beneficial impact to the operations.
 - 40 • At Alcatraz Island, the expanded maintenance area within the Quartermaster
41 Warehouse would improve the ability to accomplish maintenance work on the
42 island. The expansion and improvement to the maintenance area would result in a
43 long-term, moderate, beneficial impact to operations.

- 1 • At Muir Woods National Monument, moving the maintenance operations from
2 the Old Inn and Lower Conlon Avenue to a new a new facility in Kent Canyon,
3 pending an interagency agreement, would improve efficiencies with both the
4 monument and state park operations, reduce site impacts, and provide for a more
5 modern facility from which to base maintenance activities at the monument. The
6 shared facility would moderately benefit operations over the long term.

7

8 **Conclusion**

9 Many of the actions common to all action alternatives would result in moderate,
10 beneficial impacts to park management, operations, and facilities. However, if funding
11 and staffing levels are inadequate, many other actions would result in long-term, major,
12 adverse effects to park management, operations, and facilities.

13

POTENTIAL ENVIRONMENTAL IMPACTS AT GOLDEN GATE NATIONAL RECREATION AREA (INCLUDING ALCATRAZ ISLAND)

4

5 NATURAL RESOURCES – PHYSICAL RESOURCES

6 Carbon Footprint and Air Quality

7 *No-action Alternative*

8 *Analysis*

9 The continuation of current conditions and management would continue to result in
10 adverse impacts to air quality/carbon footprint. Baseline greenhouse gas (GHG)
11 emissions (2008) for Golden Gate National Recreation Area (parklands in Marin and San
12 Francisco counties only; no data is available for San Mateo County) are estimated at
13 5,249 metric tons of carbon equivalent (MTCE). Emissions from mobile combustion
14 represent about 50% of gross emissions.

15 At Alcatraz Island, mobile combustion associated with the operation of the ferry
16 concession would continue to be the largest contributor of Island GHG emissions.
17 Stationary combustion associated with power generation using diesel generators would be
18 eliminated and converted to conventional power supply from the mainland and onsite
19 generated renewable energy, thereby reducing total emissions. Total GHG emissions for
20 Alcatraz Island under the no-action alternative would be 1,675 MTCE.

21 Total gross emissions of the entire Golden Gate National Recreation Area / Alcatraz
22 Island (excluding San Mateo) would be 6,924 MTCE.

23 GHG emissions from visitors and NPS operations do contribute to elevated ozone and
24 other air quality concerns. The NPS would continue to reduce greenhouse gas emissions
25 by reducing energy consumption and replacing high-emitting apparatus with green
26 technology—a beneficial impact.

27 Overall, when compared to background levels of air pollution and GHG emissions in the
28 region or the nation (estimated at 6 billion in 2007), impacts to air quality from the no-
29 action alternative would be long term, adverse, and negligible.

30 *Conclusion*

31 Total gross emissions of the entire Golden Gate National Recreation Area and Alcatraz
32 Island (excluding San Mateo) would be 6,924 MTCE, resulting in long-term, minor to
33 moderate, adverse impacts to the park’s carbon footprint. Overall, when compared to
34 background levels of air pollution and GHG emissions in the region or the nation
35 (estimated at 6 billion in 2007), impacts to air quality from the no-action alternative
36 would be long term, adverse, and negligible.

37 No impairment of air resources would result from this alternative.

1 **Alternative 1: Connecting People with the Parks (NPS Preferred**
2 **Alternative for park sites in Marin, San Francisco, and San Mateo**
3 **counties)**

4 **Analysis**

5 Although visitor opportunities would be expanded and enhanced under alternative 1, the
6 levels and patterns of visitor use and travel within the park under alternative 1 would
7 remain substantially the same as under the no-action alternative; consequently, the
8 impacts to air quality/carbon footprint resulting from visitor use at Golden Gate National
9 Recreation Area would be the same as the no-action alternative.

10 Impacts to air quality/carbon footprint from new recreational development under
11 alternative 1 would result in short-term, minor, adverse impacts due to emissions
12 associated with construction activities. Long-term, adverse impacts on air quality/carbon
13 footprint would also be expected due to increases in energy consumption and related
14 emissions attributed to these new facilities.

15 Beneficial impacts would occur from the removal of a modest number of facilities and
16 structures that use energy for their operation and maintenance, resulting in long-term
17 reductions in air quality emissions and the carbon footprint. Short-term adverse impacts
18 to air quality would occur as a result of the construction activities needed to remove the
19 facilities and reclaim the disturbed sites.

20 Under alternative 1, gross emissions for the three-county area of Golden Gate National
21 Recreation Area would be reduced by 3% to 5,104 metric tons of carbon equivalent
22 (MTCE).

23 At Alcatraz Island, visitor opportunities would be expanded and access to more areas on
24 the island and would result in increased ferry transportation and visitor use. This would
25 result in slightly increased emissions associated with the ferry concession (mobile
26 combustion) and wastewater treatment. Emissions associated with energy use would also
27 increase due to increases in facility usage and energy demand. Gross emissions for
28 Alcatraz Island under alternative 1 could increase by about 15% to 1,936 MTCE.

29 The combined effect of the actions included in alternative 1 would increase the gross
30 emissions of the entire park (the three-county area plus Alcatraz) by 2% to 7,040 MTCE.
31 This would result in long-term, minor, adverse impacts on the Park Service's carbon
32 footprint. As in the no-action alternative, impacts to air quality (when compared to
33 background levels of air pollution in the region and nation) would be negligible.

34 **Conclusion**

35 The combined effect of the actions included in alternative 1 would increase the gross
36 emissions of the entire park (the three-county area plus Alcatraz) by 2% to 7,040 MTCE.
37 This would result in long-term, minor, adverse impacts on the NPS' carbon footprint. As
38 in the no-action alternative, impacts to air quality (when compared to background levels
39 of air pollution in the region and nation) would be negligible.

40 No impairment of air resources would result from this alternative.

41

42

43

1 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

2 **Analysis**

3 Although visitor opportunities would be expanded and enhanced under alternative 2, the
4 levels and patterns of visitor use and travel within Golden Gate National Recreation Area
5 would remain substantially the same as under the no-action alternative; consequently, the
6 impacts to air quality/carbon footprint resulting from visitor use would be the same as the
7 no-action alternative.

8 Impacts to air quality/carbon footprint from new recreational development under
9 alternative 2 would result in short-term, minor, adverse impacts due to emissions
10 associated with construction activities. Long-term, adverse impacts on air quality/carbon
11 footprint would also be expected due to increases in energy consumption and related
12 emissions attributed to these new facilities.

13 Beneficial impacts would occur from the removal of certain facilities and structures that
14 use energy for their operation and maintenance, resulting in long-term reductions in air
15 quality emissions and the carbon footprint. Short-term adverse impacts to air quality
16 would occur as a result of the construction activities needed to remove the facilities and
17 reclaim the disturbed sites.

18 Under alternative 2, gross emissions for the three-county area of Golden Gate National
19 Recreation Area would be reduced by 10% to 4,708 metric tons of carbon equivalent
20 (MTCE), the lowest of all of the alternatives for the three-county area.

21 At Alcatraz Island, visitor opportunities would be expanded and would result in increased
22 ferry transportation and visitor use on the Island. This would result in slightly increased
23 emissions associated with the ferry concession (mobile combustion) and wastewater
24 treatment. Emissions associated with energy use would also increase due to increases in
25 facility usage and energy demand. Gross emissions for Alcatraz Island under alternative 2
26 would increase by about 7% to 1,798 MTCE, the lowest of the three action alternatives
27 for Alcatraz Island.

28 The combined effect of the actions included in alternative 2 would reduce the gross
29 emissions of the entire park (the three-county area plus Alcatraz) by 6% to 6,506 MTCE,
30 the lowest of all of the alternatives. This would result in long-term, minor, beneficial
31 impacts on the park's carbon footprint. As in the no-action alternative, impacts to air
32 quality (when compared to background levels of air pollution in the region and nation)
33 would be negligible.

34 **Conclusion**

35 The combined effect of the actions included in alternative 2 would reduce the gross
36 emissions of the entire park (the three-county area plus Alcatraz) by 6% to 6,506 MTCE,
37 the lowest of all of the alternatives. This would result in long-term, minor, beneficial
38 impacts on the park's carbon footprint. As in the no-action alternative, impacts to air
39 quality (when compared to background levels of air pollution in the region and nation)
40 would be negligible.

41 No impairment of air resources would result from this alternative.

42

1 **Alternative 3: Focusing on National Treasures**
2 **(NPS Preferred Alternative for Alcatraz Island)**

3 **Analysis**

4 Although visitor opportunities would be expanded and enhanced under alternative 3, the
5 levels and patterns of visitor use and travel within the park under alternative 1 would
6 remain substantially the same as under the no-action alternative; consequently, the
7 impacts to air quality/carbon footprint resulting from visitor use would be the same as the
8 no-action alternative.

9 Impacts to air quality/carbon footprint from new recreational development under
10 alternative 3 would result in short-term, minor, adverse impacts due to emissions
11 associated with construction activities. Long-term, adverse impacts on air quality/carbon
12 footprint would also be expected due to increases in energy consumption and related
13 emissions attributed to these new facilities.

14 Beneficial impacts would occur from the removal of certain facilities and structures that
15 use energy for their operation and maintenance, resulting in long-term reductions in air
16 quality emissions and the carbon footprint. Short-term adverse impacts to air quality
17 would occur as a result of the construction activities needed to remove the facilities and
18 reclaim the disturbed sites.

19 Under alternative 3, gross emissions for the three-county area of GGNRA would be
20 reduced by 9% to 4,799 metric tons of carbon equivalent (MTCE).

21 At Alcatraz Island, visitor opportunities would be expanded and would result in increased
22 ferry transportation and visitor use on the Island. This would result in slightly increased
23 emissions associated with the ferry concession (mobile combustion) and wastewater
24 treatment. Emissions associated with purchased electricity would also increase due to
25 increases in facility usage and energy demand. Gross emissions for Alcatraz Island under
26 alternative 3 would increase by about 8% to 1,810 MTCE.

27 The combined effect of the actions included in alternative 3 would reduce the gross
28 emissions of the entire park (the three-county area plus Alcatraz Island) by 5 % to 6,609
29 MTCE. This would result in long-term, minor, beneficial impacts on the park's carbon
30 footprint. As in the no-action alternative, impacts to air quality (when compared to
31 background levels of air pollution in the region and nation) would be negligible.

32 **Conclusion**

33 The combined effect of the actions included in alternative 3 would reduce the gross
34 emissions of the entire park (the three-county area plus Alcatraz Island) by 5 %, to 6,609
35 MTCE. This would result in long-term, minor, beneficial impacts on the park's carbon
36 footprint. As in the no-action alternative, impacts to air quality (when compared to
37 background levels of air pollution in the region and nation) would be negligible.

38 No impairment of air resources would result from this alternative.
39

1 **Soils and Geologic Resources and Processes**

2 ***No Action Alternative***

3 ***Analysis***

4 Under the no-action alternative, the presence and maintenance of existing facilities
5 (including structures, roads, and trails) would continue to cause parkwide impacts to soils
6 and geologic resources due to the permanent loss and function of these resources and
7 from erosion associated with unsustainable trails and roads (including road cuts and
8 gullies along Conzelman Road, Milagra Ridge, and Highway 1). The impact of these
9 activities would be long-term, minor, adverse, and localized, but would occur throughout
10 the park.

11 Coastal geologic resources and processes would continue to be affected by the presence
12 of facilities and structures located in geologically sensitive areas, such as at Stinson
13 Beach (parking lot and dune interface) and Slide Ranch in Marin County, Ocean Beach
14 (seawall and infrastructure) and Fort Funston in San Francisco County, and at Devil's
15 Slide (road infrastructure) in San Mateo County. The facilities and land uses present at
16 these areas, as well as NPS management activities to protect infrastructure, would
17 continue to inhibit natural shoreline processes. The impact of these activities would be
18 long-term, moderate, adverse, and localized.

19 Projects to improve natural habitat values and ecosystem function, such as those at Big
20 Lagoon (estuarine restoration), Lower Redwood Creek (wetland restoration), Marin
21 Headlands (gully repair), in off-shore marine areas (sand deposits and management), and
22 at Land's End and Mori Point (trail/road removal and repair), would have beneficial
23 effects on soils and geologic resources and processes because they would improve or
24 restore the functionality of natural processes—the impact would be long-term, minor to
25 moderate, beneficial, and localized.

26 Recreational use would continue to cause compaction and erosion of soils, resulting in
27 long-term, minor, adverse, localized impacts throughout the park.

28 Park Service efforts to provide educational and participatory stewardship programs would
29 continue to have a beneficial effect on geologic resources and soils due to increased
30 public understanding and support for resource protection and management—the impact
31 would be long term, minor, beneficial, and parkwide.

32 At Alcatraz Island, the presence and maintenance of existing buildings and structures on
33 Alcatraz Island would continue to destabilize slopes and affect natural erosion and
34 geologic processes. The NPS would continue to implement building stabilization
35 techniques that would result in long-term, minor, adverse, localized impacts to soils and
36 geologic resources and processes.

37 ***Conclusion***

38 Overall, the impact to geologic resources and soils from the no-action alternative would
39 be long-term, range from minor adverse to moderate beneficial, and be localized and
40 parkwide. Adverse impacts would occur from the presence and maintenance of existing
41 facilities and visitor use. Beneficial impacts would occur from restoration and education
42 and stewardship activities.

1 No impairment of geologic resources would result from this alternative.

2 **Alternative 1: Connecting People with the Parks**
3 **(NPS Preferred Alternative for park sites in Marin, San Francisco, and**
4 **San Mateo counties)**

5 **Analysis**

6 Under alternative 1, a variety of management zones would be used that would assist in
7 the protection of soils and geologic resources and processes. Approximately 77% of the
8 park would be zoned using the Natural and Sensitive Resources management zones.

9 Alternative 1 would reduce soil erosion by eliminating unsustainable trails and roads,
10 resulting in long-term, minor, beneficial, localized impacts.

11 The removal of facilities/structures, and the reclamation of disturbed building sites (such
12 as at the Capehart housing area and Tennessee Valley in Marin County; Fort Miley and
13 Fort Funston in San Francisco County; and Milagra Ridge, Mori Point, and Phleger
14 Estate in San Mateo County); dune restoration at Fort Funston; managed retreat from sea-
15 level rise at Ocean Beach; and creek restoration at Eastkoot Creek, Capehart Creek, and
16 Lower Redwood Creek in Marin County where about eight acres would be improved and
17 restored to natural conditions, and at Rancho Corral de Tierra in San Mateo County
18 would improve soil function and integrity and restore natural geologic processes. The
19 impact of these activities would be long term, minor to moderate, beneficial, and
20 localized. Short-term, minor, adverse impacts (such as increased erosion or compaction in
21 adjacent areas) would occur during construction activities.

22 Visitor access and use at specific park sites would be expanded under alternative 1,
23 resulting in increased soil compaction and erosion; however, compared to use patterns
24 under the no-action alternative, only slight adverse impacts would be expected. Most
25 impacts would be contained within defined visitor use areas and on trails. The impact,
26 especially in areas off-trail, would be long term, minor, adverse, and localized. This
27 impact would occur in areas throughout the park.

28 New recreational development would have long-term, adverse, localized impacts on soils
29 and geologic resources throughout the park due to the permanent loss of soil function and
30 integrity resulting from new development and increased erosion from facility
31 construction and maintenance. The intensity of the impact would range from negligible to
32 moderate. In some areas (such as at Upper Fort Mason, Fort Miley, China Beach, and
33 Fort Funston in San Francisco County; and Sheldance Nursery and Devil's Slide in San
34 Mateo County) adverse impacts would be negligible to minor because the development
35 would occur in previously developed or disturbed sites. In other areas (such as at Stinson
36 Beach, Kirby Cove, along Highway 1, Conzelman, McCullough, and Bunker Roads, at
37 Forts Barry and Cronkhite, Slide Ranch, Golden Gate Dairy, Tennessee Valley, and
38 Marin City Ridge/Gerbode Valley in Marin County; and at Sweeney Ridge and Rancho
39 Corral de Tierra in San Mateo County) new development would cause minor to moderate
40 adverse impacts to soils and geologic resources because these areas are undeveloped and
41 the impacts would be new.

42 Impacts from NPS educational and stewardship programs would generally be the same as
43 those described in the no-action alternative.

1 At Alcatraz Island, the existing buildings and structures would be rehabilitated, which
2 would require additional stabilization measures that would impact natural geologic
3 processes. This would result in long-term, minor, adverse, localized impacts.

4 ***Conclusion***

5 The elimination of unsustainable roads and trails would reduce soil erosion, resulting in
6 long-term, minor, beneficial, localized impacts to soils. The removal of facilities and
7 structures would result in long term, minor to moderate, beneficial, localized impacts,
8 although new recreational development would have long-term, adverse, localized impacts
9 on soils and geologic resources. During the removal or construction period, short-term,
10 minor, adverse impacts (such as increased erosion or compaction in adjacent areas)
11 would occur.

12 Overall, adverse impacts would occur from new recreational development and expanded
13 visitor use. Beneficial impacts would occur from trail and road maintenance, the
14 restoration of disturbed sites and creeks, and improved resource understanding and public
15 support.

16 No impairment of geologic resources would result from this alternative.

17 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

18 ***Analysis***

19 Under alternative 2, a variety of management zones would assist in the protection of soils
20 and geologic resources and processes. Approximately 92% of the park—the largest
21 amount in any of the alternatives—would be zoned using the Natural and Sensitive
22 Resources management zones.

23 Alternative 2 would reduce soil erosion by eliminating unsustainable trails and roads and
24 removing and restoring unneeded management roads, resulting in long-term, minor to
25 moderate, beneficial, localized impacts.

26 Beneficial impacts to soils and geological resources and processes from the removal of
27 facilities/structures and restoration of natural areas would be greater than under the no-
28 action alternative. In addition to the actions included in alternative 1, the National Park
29 Service in alternative 2 would: remove portions of and restore the Capehart housing area
30 to a natural setting; relocate Slide Ranch out of a sensitive geologic hazard area; work
31 with Marin County to realign the highway and minimize impacts to Redwood Creek; and
32 work with Caltrans to further protect geologic processes on the coast of Marin County,
33 including the potential abandonment of a small segment of Highway 1. These activities
34 would restore soil function, integrity, and natural geologic processes; when combined
35 with those actions included in alternative 1, would result in long-term, moderate,
36 beneficial, and localized impacts.

37 Impacts from visitor access and use at specific park sites would be the same as those
38 described in alternative 1, resulting in long-term, minor, adverse, and localized impacts.

39 The type of adverse impacts associated with new recreational development under
40 alternative 2 would be the same impacts as described in alternative 1 although the amount
41 and distribution of proposed facilities is reduced, resulting in minor, adverse, localized
42 impacts to soils and geologic resources.

1 Impacts from NPS educational and stewardship programs would generally be the same as
2 those described in the no-action alternative.

3 At Alcatraz Island, the existing buildings and structures would be stabilized, but coastal
4 erosion processes would be allowed to evolve naturally. This would result in long-term,
5 minor, beneficial, localized impacts to geologic resources and processes.

6 ***Conclusion***

7 The elimination of unsustainable trails and roads and the removal and restoration of
8 unneeded management roads, would reduce soil erosion, resulting in long-term, minor to
9 moderate, beneficial, localized impacts.

10 The removal of facilities/structures and restoration of a large number of natural areas
11 would result in long-term, moderate, beneficial, and localized impacts.

12 Overall, adverse impacts would occur from new recreational development and expanded
13 visitor use. Beneficial impacts would occur from trail and road maintenance, the
14 restoration of disturbed sites and creeks.

15 No impairment of geologic resources would result from this alternative.

16 ***Alternative 3: Focusing on National Treasures*** 17 ***(NPS Preferred Alternative for Alcatraz Island)***

18 ***Analysis***

19 Under alternative 3, a variety of management zones would be used that would assist in
20 the protection of soils and geologic resources and processes. Approximately 88% of the
21 park would be zoned in the Natural and Sensitive Resources zones.

22 Impacts to soils from reducing soil erosion would be the same as described in the
23 alternative 1, resulting in long-term, minor, beneficial, localized impacts.

24 Impacts to soils and geologic resources and processes from the removal of facilities and
25 structures and the reclamation of disturbed building sites under alternative 3 would be the
26 same as those described in alternative 1, resulting in long-term, minor to moderate,
27 beneficial, and localized impacts.

28 Impacts from visitor access and use at specific park sites would be the same as those
29 described in alternative 1, resulting in long-term, minor, adverse, and localized impacts.

30 Impacts from new recreational development under alternative 3 would generally be the
31 same as those described in alternative 1. Although the distribution of new development
32 may be slightly different, the resulting impact to soils and geologic resources and
33 processes would remain long term, minor to moderate, adverse, and localized.

34 Impacts from NPS educational and stewardship programs would generally be the same as
35 those described in the no-action alternative.

36 At Alcatraz Island, the existing buildings and structures would be rehabilitated, which
37 would require additional stabilization measures that would impact natural geologic
38 processes. This would result in long-term, minor, adverse, localized impacts.

39

1 ***Conclusion***

2 The reduction in soil erosion and the reclamation of disturbed building sites would result
3 in long-term, minor to moderate, beneficial, localized impacts. Impacts from new
4 recreational development would be long term, minor to moderate, adverse, and localized.

5 Overall, beneficial impacts would occur from trail and road maintenance, the restoration
6 of disturbed sites and creeks, and improved resource understanding and public support.
7 Adverse impacts would occur from new recreational development and expanded visitor
8 use.

9 No impairment of geologic resources would result from this alternative.

10

11 **Water Resources and Hydrologic Processes**

12 ***No Action Alternative***

13 ***Analysis***

14 Under the no-action alternative, the presence and maintenance (or lack of maintenance in
15 some cases) of existing facilities (including structures, roads, and trails) would continue
16 to cause localized impacts to water quality due to pollution from urban runoff and
17 turbidity from soil erosion. The impact of these activities would be long term, minor to
18 moderate, adverse, and localized, but would occur throughout the park.

19 Structures would remain in the 100-year floodplains of several creeks resulting in adverse
20 impacts. In Marin County, park facilities at Stinson Beach (parking lots and picnic areas)
21 and Muir Beach (parking lot and Pacific Way) would continue to affect floodplain
22 function along Redwood Creek and Rodeo Creek. In San Mateo County, horse stables
23 located in the lower portion of the Rancho Corral de Tierra property are located in the
24 San Vicente Creek floodplain and would continue to affect floodplain function. Retention
25 of these facilities would continue to slightly affect the flow of water during floods and the
26 capacity of the floodplain to store floodwaters. The impact would be long term, minor,
27 adverse, and localized.

28 Projects to improve natural habitat values and ecosystem function, such as those at Big
29 Lagoon (estuarine restoration), Lower Redwood Creek (wetland restoration), Marin
30 Headlands (gully repair), and at Land's End and Mori Point (trail/road removal and
31 repair), would have beneficial effects on water resources and hydrologic processes
32 because they would improve and restore the function and integrity of natural hydrologic
33 systems—the impact would be long term, minor to moderate, beneficial, and localized.

34 Recreational use would continue to cause erosion of soils resulting in turbidity. Vehicle
35 use at parking areas and on roadways throughout the park would continue to affect water
36 quality from runoff that contains chemical contaminants. These activities would result in
37 long-term, minor, adverse, localized impacts to water quality throughout the park.

38 Park Service efforts to provide educational and participatory stewardship programs would
39 continue to have a beneficial effect on water resources and hydrologic processes due to
40 increased public understanding and support for resource protection and management—
41 the impact would be long term, minor, beneficial, and parkwide.

1 At Alcatraz Island, the visitor use and NPS operations (including the cleaning of bird
2 guano) would continue to contribute nutrients and sediment to the adjacent marine waters
3 through runoff. Runoff from impervious surfaces on the Island, such as existing buildings
4 and structures, would also contribute to this issue. Vessels, primarily the passenger ferry
5 concessionaire, traveling to the island would impact water quality by introducing
6 hydrocarbons and other chemicals into the Bay, as well as increasing turbidity near the
7 docking station on the island. Impacts from these activities would result in long-term,
8 minor, adverse, localized impacts to water quality.

9 ***Conclusion***

10 The continued existence of structures and facilities in some areas of the park would have
11 long-term, minor to moderate, adverse, and localized impacts on water resources and
12 hydrologic processes.

13 Projects to improve natural habitat values and ecosystem function would have long-term,
14 minor to moderate, beneficial, and localized impacts on water resources and hydrologic
15 processes.

16 Generally, adverse impacts would occur from the continued presence and maintenance of
17 existing facilities, the continued presence of the existing volume of vehicular traffic, and
18 continued patterns of visitor use. Beneficial impacts would occur from restoration of
19 natural areas and from education and stewardship activities.

20 No impairment of water resources would result from this alternative.

21 ***Alternative 1: Connecting People with the Parks***
22 ***(NPS Preferred Alternative for Park Sites in Marin, San Francisco, and***
23 ***San Mateo counties)***

24 ***Analysis***

25 Under alternative 1, a variety of management zones would be used that would assist in
26 the protection of water resources and hydrologic processes. Approximately 77% of the
27 park would be zoned using the Natural and Sensitive Resources zones.

28 Impacts to water-related resources from the continued presence and maintenance of
29 existing facilities (including structures, roads, and trails) under alternative 1 would be less
30 than the no-action alternative because impacts to water quality caused by erosion from
31 unsustainable trails and roads would be reduced. Alternative 1 would develop a
32 sustainable trail system and remove and restore unneeded and unsustainable roads and
33 trails, as well as maintain all trails and roads. These activities would result in long-term,
34 minor to moderate, beneficial, localized impacts on water quality. Short-term, minor,
35 adverse impacts to water quality could occur from sedimentation and runoff during
36 construction activities.

37 The removal of facilities and structures and the reclamation of disturbed building sites
38 (such as at the Capehart housing area and Tennessee Valley in Marin County; dune
39 restoration at Fort Funston) would improve natural hydrologic processes. The impact of
40 these activities would be long term, minor to moderate, beneficial, and localized.

41 Beneficial effects on stream character, water quality, wetlands, floodplains, and
42 watershed processes would occur from creek restoration at Stinson Beach (Eastkoot

1 Creek) and especially at Rancho Corral de Tierra. Incised creek banks that adversely
2 impact floodplain function by restricting creek sinuosity would be restored, thereby
3 expanding and enhancing wetlands and improving water quality. The overall stream
4 character and function would be improved by creating a more natural watercourse that
5 would reduce the potential for erosion, re-create the natural hydrologic regime, and
6 contribute to improvements in restoring watershed processes and regional water quality.
7 The impact of these activities would be long-term, moderate, beneficial, and localized.

8 Impacts to floodplains would be the same as those described in the no-action alternative.

9 Visitor access and use would be expanded throughout the park under alternative 1,
10 potentially resulting in some increase in erosion along trails and at primary visitor use
11 areas that could have impacts on water quality—the impact would be long-term,
12 negligible to minor, adverse, and localized.

13 New and/or improved recreational development—including new visitor facilities and
14 amenities at Stinson Beach, Kirby Cove, along Highway 1, Conzelman, McCullough, and
15 Bunker Roads, at Forts Barry and Cronkhite, Slide Ranch, Golden Gate Dairy, Tennessee
16 Valley, and Marin City Ridge/Gerbode Valley in Marin County; at Upper Fort Mason,
17 Fort Miley, China Beach, and Fort Funston in San Francisco County; and at Milagra
18 Ridge, Sweeney Ridge, Phleger Estate, and Rancho Corral de Tierra in San Mateo
19 County—would have short-term, negligible to minor, adverse, localized impacts on water
20 quality from increased erosion and sedimentation, and the potential for chemical
21 contamination resulting from inadvertent chemical spills from heavy equipment at
22 construction sites. Similar impacts to water quality could occur over the long-term due to
23 the increased potential for urban pollutants to runoff from parking lots and other
24 developed features.

25 In some areas (such as at Sheldance Nursery and Devil's Slide in San Mateo County)
26 adverse impacts would be negligible to minor because the development would occur in
27 previously developed or disturbed sites. In other areas (such as at Rancho Corral de
28 Tierra in San Mateo County), adverse impacts to water resources would be minor to
29 moderate because new development would occur in undisturbed sites.

30 Impacts from NPS educational and stewardship programs would generally be the same as
31 those described in the no-action alternative.

32 At Alcatraz Island, impacts from visitor use and NPS operations (including the cleaning
33 of bird guano) would be greater than those described in the no-action alternative because
34 greater emphasis would be placed on visitor access and the cleaning of more primary use
35 areas, resulting in increased potential for water quality impacts such as nutrient and
36 sediment inputs into marine waters. Turbidity and chemical contamination may also
37 increase due to increased vessel traffic in the Bay, Impacts from these activities would
38 result in long-term, minor to moderate, adverse, localized impacts to water quality.

39 ***Conclusion***

40 The removal and reclamation of facilities and structures, the re-creation of natural
41 hydrologic regimes, and restoration of watershed processes would result in long-term
42 minor to moderate, beneficial impacts to water quality, while the construction,

1 maintenance or removal of trails and facilities would have short-term, minor to moderate,
2 adverse impacts to water quality.

3 There would be long-term minor to moderate, adverse, localized impacts to water quality
4 on Alcatraz Island resulting from cleaning of primary visitor use areas and increased
5 vessel traffic in San Francisco Bay.

6 Generally, adverse impacts would occur from new recreational development and
7 expanded visitor use. Beneficial impacts would occur from trail and road maintenance
8 and the restoration of disturbed sites and creeks.

9 No impairment of water resources would result from this alternative.

10 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

11 **Analysis**

12 Under alternative 2, a variety of management zones would be used that would assist in
13 the protection of water resources and hydrologic processes. Approximately 92% of the
14 park would be zoned using the Natural and Sensitive Resources zones.

15 Alternative 2 would reduce impacts to water quality by eliminating erosion from
16 unsustainable trails and unneeded management roads, resulting in long-term, minor to
17 moderate, beneficial, localized impacts. Short-term, minor, adverse impacts to water
18 quality could occur from sedimentation and runoff during construction activities.

19 The magnitude of beneficial impacts associated with the removal of facilities/structures
20 and the reclamation of disturbed building sites would be greater than under the no-action
21 alternative. In alternative 2, in addition to the actions included in alternative 1, the
22 National Park Service would completely remove and restore the Capehart housing area;
23 work with Marin County to realign the highway and minimize impacts to Redwood
24 Creek; and could remove or relocate all horse stable stables from the Rancho Corral de
25 Tierra property. These activities would improve natural hydrologic processes; when
26 combined with those actions included in alternative 1, they would result in long-term,
27 moderate, beneficial, and localized impacts on water resources and hydrologic processes.

28 Beneficial effects on stream character, water quality, wetlands, floodplains, and
29 watershed processes would occur from creek restoration at Stinson Beach (Eastkoot
30 Creek) and especially at Rancho Corral de Tierra. Incised creek banks that adversely
31 impact floodplain function by restricting creek sinuosity would be restored, thereby
32 expanding and enhancing wetlands and improving water quality. The overall stream
33 character and function would be improved by creating a more natural watercourse that
34 would reduce the potential for erosion, re-create the natural hydrologic regime, and
35 contribute to improvements in restoring watershed processes and regional water quality.
36 Collaborating with municipalities to increase water storage would benefit water resources
37 by increasing water quantity with park streams. The impact of these activities would be
38 long-term, moderate, beneficial, and localized.

39 Impacts to floodplains would be less than those described in the no-action alternative
40 because the removal of the lower horse stable from the 100-year floodplain of San
41 Vicente Creek at Rancho Corral de Tierra would remove improve floodplain function and
42 integrity – a long-term, minor, beneficial, localized impact.

1 Impacts from visitor access and use would be the same as those described in alternative 1,
2 resulting in long-term, minor, adverse, and localized impacts.

3 The magnitude of adverse impacts associated with new recreational development under
4 alternative 2 would be less than alternative 1 because the amount and distribution of
5 proposed facilities is reduced. However, the types of impacts would generally be the
6 same and would result in minor, adverse, localized impacts to water quality and water
7 resources.

8 Impacts from NPS educational and stewardship programs would generally be the same as
9 those described in the no-action alternative.

10 At Alcatraz Island, impacts from visitor use and NPS operations would be less than those
11 described in the no-action alternative because greater portions of the island would be left
12 to natural reclamation and the focus on maintaining visitor use areas (including the
13 cleaning of bird guano) would be reduced. Therefore, nutrient and sediment inputs into
14 marine waters would be reduced. Water quality impacts associated with vessel traffic
15 would be expected to be the same as in the no-action alternative. Impacts from these
16 activities would result in long-term, minor, beneficial, localized impacts to water quality.

17 ***Conclusion***

18 The removal of unsustainable trails and unneeded management roads, removal of
19 facilities and structures, creek restorations, realignment of small sections of roadway, and
20 the relocation of horse stables from adjacent creeks would result in long-term, minor to
21 moderate, beneficial impacts to water resources, wetlands, floodplains, and overall
22 hydrologic processes. However, the construction, maintenance, or removal activities
23 associated with these changes would have short-term, minor to moderate, adverse
24 impacts to water quality.

25 Leaving greater portions of Alcatraz Island to natural reclamation and reducing the visitor
26 use area on the island would result in long-term, minor, beneficial, localized impacts to
27 water quality. The visitor use area would be reduced providing for a larger area of the
28 island to naturally reclaim and thereby reduce water quality impacts caused by human
29 use.

30 Generally, adverse impacts would occur from new recreational development and
31 expanded visitor use. Beneficial impacts would occur from trail and road maintenance,
32 and the restoration of disturbed sites, creeks, and floodplains.

33 No impairment of water resources would result from this alternative.

34 ***Alternative 3: Focusing on National Treasures*** 35 ***(NPS Preferred Alternative for Alcatraz Island)***

36 ***Analysis***

37 Under alternative 3, a variety of management zones would be used that would assist in
38 the protection of water resources and hydrologic processes. Approximately 88% of the
39 park would be zoned using the Natural and Sensitive Resources zones.

40 As described in alternative 1, impacts to water quality from reducing erosion from
41 unsustainable trails and roads would be reduced when compared to the no-action

1 alternative, resulting in long-term, minor to moderate, beneficial, localized impacts.
2 Short-term, minor, adverse impacts to water quality could occur from sedimentation and
3 runoff during construction activities.

4 As described in alternative 1, the removal of facilities/structures and the reclamation of
5 disturbed building sites would result in long-term, minor to moderate, beneficial, and
6 localized impacts to water resources and hydrologic processes.

7 As described in alternative 1, creek restoration would be result in enhanced wetlands,
8 improved water quality, and overall improvements to stream character and function. The
9 impact of these activities would be long-term, moderate, beneficial, and localized.

10 Impacts to floodplains would be the same as those described in the no-action alternative.

11 Visitor access and use would be expanded under alternative 3, potentially resulting in
12 some increase in erosion along trails and at primary visitor use areas that could have
13 impacts on water quality—the impact would be long-term, negligible to minor, adverse,
14 and localized.

15 Impacts from new recreational development would generally be the same as described in
16 alternative 1, resulting in short-term, negligible to minor, adverse, localized impacts on
17 water quality from increased erosion and sedimentation, and the potential for chemical
18 contamination resulting from inadvertent chemical spills from heavy equipment at
19 construction sites. Similar impacts to water quality could occur over the long-term due to
20 the increased potential for urban pollutants to runoff from parking lots and other
21 developed features.

22 Impacts from NPS educational and stewardship programs would generally be the same as
23 those described in the no-action alternative.

24 At Alcatraz Island, impacts from visitor use and NPS operations (including the cleaning
25 of bird guano) would be greater than those described in the no-action alternative because
26 greater emphasis would be placed on visitor access and the cleaning or more primary use
27 areas, resulting in increased potential for water quality impacts such as nutrient and
28 sediment inputs into marine waters. Water quality impacts, such as turbidity and chemical
29 contamination, from increased vessel traffic in the Bay may also increase. Additional
30 impacts associated with the scale of historic structure rehabilitation and facility
31 improvements under alternative 3 could result in increased impacts to water quality.
32 Impacts from these activities would result in long-term, minor to moderate, adverse,
33 localized impacts to water quality.

34 **Conclusion**

35 The removal and natural restoration of unsustainable trails and unneeded management
36 roads, the removal of facilities and structures, and creek restoration efforts would result
37 in long-term, minor to moderate, beneficial impacts to water resources and hydrologic
38 process, However, the construction, maintenance, or removal of trails and facilities would
39 have short-term, minor to moderate, adverse impacts to water quality.

40 The scale of historic structure rehabilitation and facility improvements on Alcatraz Island
41 could result in increased impacts to water quality. The cleaning the primary visitor use

1 areas and the increased vessel traffic in San Francisco Bay would result in long-term
2 minor to moderate, adverse, localized impacts to water quality on Alcatraz Island.

3 Adverse impacts would occur from new recreational development and expanded visitor
4 use. Beneficial impacts would occur from trail and road maintenance and the restoration
5 of disturbed sites and creeks. No impairment of water resources would result from this
6 alternative.

7 No impairment of water resources would result from this alternative.

8

9 **NATURAL RESOURCES - BIOLOGICAL RESOURCES**

10 **Habitat (Vegetation and Wildlife)**

11 ***No Action Alternative***

12 ***Analysis***

13 Under the no-action alternative, the presence and maintenance (or lack of maintenance in
14 some cases) of existing facilities (including structures, roads, and trails) would continue
15 to cause localized impacts to vegetation and wildlife habitat by fragmenting natural areas
16 and increasing the potential for exotic plant species to displace native species and affect
17 native habitat. Maintaining facilities and structures in coastal interface areas would
18 continue to disrupt natural shoreline habitat values resulting in impacts to species that
19 depend on these areas and diminished biodiversity in general. The impact of these
20 activities would be long-term, minor to moderate, adverse, and localized, but would occur
21 throughout the park.

22 Projects to improve natural habitat values and ecosystem function, such as those at Big
23 Lagoon (estuarine restoration), Lower Redwood Creek (wetland restoration), Marin
24 Headlands (gully repair), Kirby Cove (45 acres of exotic plant removal), Fort Funston (20
25 acres of exotic plant removal), in off-shore marine areas (sand deposits and
26 management), and at Land's End and Mori Point (trail/road removal and repair), would
27 have beneficial effects on vegetation, wildlife, and wildlife habitat because they would
28 reduce the impacts of exotic plant species, improve or restore the functionality of natural
29 processes, and improve specific habitat components that are required by the affected
30 species. These kinds of activities would reduce environmental stressors and increase the
31 resiliency of species and systems to the effects of climate change. Rehabilitating
32 disturbed sites would improve the integrity and diversity of habitats available to aquatic
33 and terrestrial organisms. Ongoing vegetation management and monitoring of plants and
34 wildlife allows the National Park Service to improve native habitat conditions. The use of
35 spatial and temporal closures would continue to protect wildlife and wildlife habitat. The
36 impact of these activities would be long-term, minor to moderate, beneficial, and
37 localized.

38 Recreational use would continue to reduce habitat integrity by trampling plants,
39 introducing and increasing the spread of exotic species, causing disturbance (flushing and
40 displacement) to animals, and increasing the potential for human-wildlife conflict
41 resulting from habituation due to the presence of humans and the introduction of

1 unnatural food sources. Recreational use also generates noise and unnatural light sources
2 that affect wildlife. These activities would result in long-term, minor to moderate,
3 adverse, localized impacts throughout the park.

4 Park Service efforts to provide educational and participatory stewardship programs would
5 continue to have a beneficial effect on vegetation and wildlife habitat due to increased
6 public understanding and support for resource protection and management – the impact
7 would be long-term, minor, beneficial, and parkwide.

8 At Alcatraz Island, waterbirds would continue to be affected by visitor use (day use,
9 special events, etc.) and NPS operations, including managing gulls and other waterbirds
10 in visitor use areas. Boat traffic in the marine waters adjacent to the Island would
11 continue to cause disturbance to nesting birds. These activities would result in long-term,
12 minor, adverse, localized impacts. At the same time, the National Park Service would
13 continue to protect nesting habitat and bird use areas on the Island using seasonal
14 closures, especially the preferred habitats on the western perimeter of the Island. This
15 would result in long-term, moderate, beneficial, localized impacts to waterbird
16 populations. Given the combined effects of disturbance and protective actions, the
17 numbers of breeding pairs of waterbirds on the Island have steadily increased over the
18 last decade. This trend is expected to continue. Collectively, impacts to waterbirds as a
19 result of the no-action alternative would be long-term, minor to moderate, adverse, and
20 localized.

21 ***Conclusion***

22 The conditions related to existing facilities would continue to cause fragmentation of
23 habitat and the potential for exotic plant species to displace native species. The
24 continuation of current recreational use also would reduce habitat integrity. The impacts
25 would be long-term, minor to moderate, adverse, and localized but would occur
26 throughout the park.

27 Habitat restoration efforts and educational and participatory stewardship programs would
28 result in long-term, minor to moderate, beneficial impacts that would occur both at the
29 local level (habitat restoration) and parkwide(stewardship programs).

30 Impacts to waterbirds would be long-term, minor to moderate, adverse, and localized.

31 Generally, adverse impacts would occur from the presence and maintenance of existing
32 facilities and visitor use. Beneficial impacts would occur from restoration and ongoing
33 management and monitoring activities.

34 No impairment of vegetation or wildlife resources would result from this alternative.

35 ***Alternative 1: Connecting People with the Parks (NPS Preferred*** 36 ***Alternative for park sites in Marin, San Francisco, and San Mateo*** 37 ***counties)***

38 ***Analysis***

39 Under alternative 1, a variety of management zones would be used that would assist in
40 the protection of vegetation and wildlife habitat. Approximately 77% of the park would
41 be zoned as the Natural and Sensitive Resources zone.

1 Sensitive Resource zones at Bird Island and Point Bonita Cove would serve to protect
2 seabirds and pinipeds, a beneficial impact when compared to the no-action alternative.

3 The impacts to vegetation and wildlife from the continued presence and maintenance of
4 existing facilities (including structures, roads, and trails) under alternative 1 would be less
5 than the no-action alternative because impacts to vegetation and wildlife habitat caused
6 by erosion from unsustainable trails and roads would be reduced. Alternative 1 would
7 develop a sustainable trail system and eliminate and rehabilitate unneeded and
8 unsustainable roads and trails, as well as maintain all trails and roads. Impacts to native
9 habitat from fragmentation and exotic species would be reduced. These activities would
10 result in long-term, minor, beneficial, localized impacts on vegetation and wildlife.

11 The removal of facilities/structures and the reclamation of disturbed building sites (such
12 as at the Capehart housing area and Tennessee Valley in Marin County; dune restoration
13 at Fort Funston; the removal of 30 acres of European beach grass would improve the
14 integrity of natural habitats and processes; restoration of a large tract of second-
15 generation redwood forest at Phleger Estate; and extensive exotic plant removal at Ranch
16 Corral de Tierra. Creek restoration at Stinson Beach (Eastkoot Creek), and especially at
17 Rancho Corral de Tierra would improve vegetation and wildlife habitat by improving
18 habitat structure and the diversity of habitats available to support various species' needs.
19 These kinds of activities would reduce environmental stressors and increase the resiliency
20 of species and systems to the effects of climate change. The impact of these activities
21 would be long-term, moderate, beneficial, and localized.

22 Visitor access and use would be expanded under alternative 1, potentially resulting in
23 additional impacts to vegetation (trampling) and wildlife (disturbance) along trails and at
24 primary visitor use areas – the impact would be long-term, minor, adverse, and localized.

25 New and/or improved recreational development (including new visitor facilities and
26 amenities at Stinson Beach, Kirby Cove, along Highway 1, Conzelman, McCullough, and
27 Bunker Roads, at Forts Barry and Cronkhite, Slide Ranch, Golden Gate Dairy, Tennessee
28 Valley, and Marin City Ridge/Gerbode Valley in Marin County; at Upper Fort Mason,
29 Fort Miley, China Beach, and Fort Funston in San Francisco County; and at Milagra
30 Ridge, Sweeney Ridge, Phleger Estate, and Rancho Corral de Tierra in San Mateo
31 County) would have long-term, minor, adverse, localized impacts on vegetation and
32 wildlife due to the permanent loss of plants and wildlife habitat. Short-term, minor,
33 adverse impacts to vegetation would also occur from injury or loss of plants during
34 construction activities; however, the area would be re-planted with native plants and the
35 natural habitat would be reclaimed. Similarly, short-term adverse impacts to wildlife,
36 such as disturbance, would occur during construction. The rehabilitation and use of Pier 4
37 at Fort Mason would result in impacts (habitat disturbance during construction) to marine
38 resources—the impact would be short-term, minor, adverse, and localized.

39 Impacts from NPS educational and stewardship programs would generally be the same as
40 those described in the no-action alternative. Similarly, impacts from vegetation and
41 wildlife management and monitoring activities under alternative 1 would be the same as
42 those described in the no-action alternative. However, the establishment of a native plant
43 nursery would provide additional capacity to improve native vegetation and wildlife
44 habitat and expand stewardship efforts—a beneficial impact.

1 At Alcatraz Island, adverse impacts to waterbirds under alternative 1 would be greater
2 than those described in the no-action alternative because new visitor amenities (namely
3 food service, modest overnight accommodations, and special events) would cause
4 increased disturbance to nesting waterbirds and human-wildlife conflict. Additionally,
5 historic restoration of the Parade Grounds and removal of the rubble piles would cause
6 habitat loss and disturbance to waterbird populations. Expanded visitor use of the Agave
7 Trail would affect use of the tidepools by foraging birds. As in the no-action alternative,
8 the National Park Service would continue to protect nesting and roosting habitats and
9 initiate habitat enhancements in other areas of the island where possible—resulting in
10 beneficial impacts. Boat traffic in the vicinity of the colonial nesting birds would be
11 restricted to nonmotorized boating, resulting in beneficial impacts. Given the combined
12 effects of disturbance and protective actions, the numbers of breeding pairs of waterbirds
13 on the Island could decrease over time depending on the frequency and intensity of
14 expanded visitor activity. Collectively, these activities would result in long-term,
15 moderate, adverse, localized impacts to waterbirds on the island.

16 ***Conclusion***

17 The development of a sustainable trail system and elimination of unneeded and
18 unsustainable roads and trails, the removal of facilities/structures with reclamation of
19 disturbed building sites, and habitat restoration efforts would result in long-term, minor to
20 moderate, beneficial, localized impacts on vegetation and wildlife.

21 The expansion of visitor access and use and the development of new or improved
22 recreational facilities would result in long-term, minor, adverse, and localized impacts.
23 The construction activities related to these developments would result in short-term,
24 minor, and adverse impacts.

25 Impacts from NPS educational and stewardship programs would generally be the same as
26 those described in the no-action alternative. Similarly, impacts from vegetation and
27 wildlife management and monitoring activities under alternative 1 would be the same as
28 those described in the no-action alternative. However, the establishment of a native plant
29 nursery would provide additional capacity to improve native vegetation and wildlife
30 habitat and expand stewardship efforts—a beneficial impact.

31 Habitat restoration efforts and educational and participatory stewardship programs would
32 result in long-term, minor to moderate, beneficial impacts that would occur both at the
33 local level (habitat restoration) and parkwide (stewardship programs). An additional
34 beneficial impact would result from the the establishment of a native plant nursery.

35 Impacts to waterbirds would be long-term, moderate, adverse, and localized.

36 Generally, adverse impacts would occur from the presence and maintenance of existing
37 facilities and visitor use. Beneficial impacts would occur from natural resource
38 restoration and ongoing management and monitoring activities.

39 No impairment of vegetation or wildlife resources would result from this alternative.

40

1 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

2 ***Analysis***

3 Under alternative 2, a variety of management zones would be used that would assist in
4 the protection of vegetation and wildlife habitat. Approximately 92% of the park would
5 be zoned using the Natural and Sensitive Resources zones.

6 Sensitive Resource zones at Bird Island and Point Bonita Cove would serve to protect
7 seabirds and pinipeds, a beneficial impact when compared to the no-action alternative.

8 The impacts to vegetation and wildlife from the continued presence and maintenance of
9 existing facilities (including structures, roads, and trails) under alternative 2 would be less
10 than the no-action alternative because impacts to vegetation and wildlife habitat caused
11 by erosion from unsustainable trails and roads would be reduced. Alternative 2 would
12 develop a sustainable trail system and eliminate and rehabilitate unneeded trails and
13 management roads, as well as maintain all trails and roads. Impacts to native habitat from
14 fragmentation and exotic species would be reduced. These activities would result in long-
15 term, minor, beneficial, localized impacts on vegetation and wildlife.

16 The magnitude of beneficial impacts associated with the removal of facilities/structures
17 and the reclamation of disturbed building sites, as well as from creek restoration, would
18 be greater than under the no-action alternative. In alternative 2, in addition to the actions
19 included in alternative 1, the National Park Service would completely remove and restore
20 the Capehart housing area; work with Marin County to realign the highway and minimize
21 impacts to Redwood Creek; remove structures and restore about 10 acres at Slide Ranch,
22 as well as convert about 3.5 acres of existing farmland to native habitat; restore about 18
23 acres of uplands at Golden Gate Dairy; remove the nonnative forest and improve natural
24 habitat conditions at Fort Miley; and improve the and remove all horse stable stables
25 from the Rancho Corral de Tierra property. These kinds of activities would reduce
26 environmental stressors and increase the resiliency of species and systems to the effects
27 of climate change. These activities would also improve habitat structure and the diversity
28 of habitats available to support various species' needs, and when combined with those
29 actions included in alternative 1, would result in long-term, moderate, beneficial, and
30 localized impacts.

31 Visitor access and use would be expanded under alternative 2, potentially resulting in
32 additional impacts to vegetation (trampling) and wildlife (disturbance) along trails and at
33 primary visitor use areas—the impact would be long-term, minor, adverse, and localized.

34 The type of adverse impacts associated with new recreational development under
35 alternative 2 would be the same impacts as described in alternative 1 although the amount
36 and distribution of proposed facilities is reduced resulting in minor, adverse, localized
37 impacts to vegetation and wildlife habitat.

38 Impacts from NPS educational and stewardship programs would generally be the same as
39 those described in the no-action alternative, with one exception. Partnering with other
40 agencies to manage visitor access and promote restoration and habitat management as
41 part of the UNESCO Biosphere Reserve would elevate this issue and could result in
42 benefits to vegetation and wildlife habitat. Impacts from vegetation and wildlife
43 management and monitoring activities under alternative 2 would be the same as those

1 described in the no-action alternative. The establishment of a native plant nursery would
2 provide additional capacity to improve native vegetation and wildlife habitat and expand
3 stewardship efforts—resulting in a beneficial impact.

4 At Alcatraz Island, adverse impacts to waterbirds under alternative 2 would be less than
5 those described in the no-action alternative because waterbird nesting and use areas
6 would be allowed to expand and conflicts with visitors use and NPS operations would be
7 reduced. Visitor use areas would be expanded and visitor activities would be highly
8 controlled on the Island. The Model Industries Building and New Industries Building
9 would be managed as ruins and would provide additional habitat to nesting birds. Park
10 operations near the Power Plant would be modified to reduce conflicts with nesting birds.
11 The marine waters within the vicinity of the colonial nesting birds would be closed to
12 boating during the breeding season, resulting in beneficial impacts. The allowance of
13 modest overnight accommodations on the Island would increase the potential for human-
14 wildlife conflict, an adverse impact. As in the no-action alternative, the National Park
15 Service would continue to protect nesting and roosting habitats and initiate habitat
16 enhancements in other areas of the Island where possible—beneficial impacts. Given the
17 combined effects of disturbance and protective actions, the numbers of breeding pairs of
18 waterbirds on the Island would be expected to be maintained or increase over time.
19 Collectively, these activities would result in long-term, moderate, beneficial, localized
20 impacts to waterbirds on the island.

21 **Conclusion**

22 The development of a sustainable trail system and the elimination of unneeded roads, and
23 the removal of a large number of structures and the restoration of natural vegetation in
24 these areas would result in long-term, minor, beneficial, localized impacts on vegetation
25 and wildlife.

26 The expansion of visitor access and use and the development of new or improved
27 recreational facilities would result in long-term, minor, adverse, and localized impacts.
28 The construction activities related to these developments would result in short-term,
29 minor, and adverse impacts.

30 Habitat restoration efforts and educational and participatory stewardship programs would
31 result in long-term, minor to moderate, beneficial impacts that would occur both at the
32 local level (habitat restoration) and parkwide(stewardship programs). Additional
33 beneficial impacts would result from the the establishment of a native plant nursery and
34 partnering with other agencies to manage visitor access and promote restoration and
35 habitat management as part of the UNESCO Biosphere Reserve.

36 Impacts to waterbirds on the island would be long-term, moderate, beneficial, localized i

37 Generally, adverse impacts would occur from the presence and maintenance of existing
38 facilities and visitor use. Beneficial impacts would occur from restoration and ongoing
39 management and monitoring activities.

40 No impairment of vegetation or wildlife resources would result from this alternative.

41

1 ***Alternative 3: Focusing on National Treasures***

2 ***Analysis***

3 Under alternative 3, a variety of management zones would be used that would assist in
4 the protection of vegetation and wildlife habitat. Approximately 88% of the park would
5 be zoned using the Natural and Sensitive Resources zones.

6 The impacts to vegetation and wildlife from the continued presence and maintenance of
7 existing facilities (including structures, roads, and trails) under alternative 3 would be less
8 than the no-action alternative because impacts to vegetation and wildlife habitat caused
9 by erosion from unsustainable trails and roads would be reduced. Alternative 3 would
10 develop a sustainable trail system and eliminate and rehabilitate unneeded and
11 unsustainable roads and trails, as well as maintain all trails and roads. Impacts to native
12 habitat from fragmentation and exotic species would be reduced. These activities would
13 result in long-term, minor, beneficial, localized impacts on vegetation and wildlife.

14 Natural resource restoration includes the dune restoration that involves the removal of 30
15 acres of European beach grass at Fort Funston; restoration of a large tract of second-
16 generation redwood forest at Phleger Estate; and extensive exotic plant removal at Ranch
17 Corral de Tierra and the managed retreat from sea-level rise at Ocean Beach would
18 improve the integrity of natural habitats and processes. Creek restoration at Stinson
19 Beach (Eastkoot Creek), and especially at Rancho Corral de Tierra would improve
20 vegetation and wildlife habitat by improving habitat structure and the diversity of habitats
21 available to support various species' needs. These kinds of activities would reduce
22 environmental stressors and increase the resiliency of species and systems to the effects
23 of climate change. The impact of these activities would be long-term, moderate,
24 beneficial, and localized.

25 Visitor access and use would be expanded under alternative 3, potentially resulting in
26 additional impacts to vegetation (trampling) and wildlife (disturbance) along trails and at
27 primary visitor use areas—the impact would be long-term, minor, adverse, and localized.

28 New and/or improved recreational development (including new visitor facilities and
29 amenities at Stinson Beach, Kirby Cove, along Highway 1, Conzelman, McCullough, and
30 Bunker Roads, at Forts Barry and Cronkhite, Slide Ranch, Golden Gate Dairy, Tennessee
31 Valley, and Marin City Ridge/Gerbode Valley in Marin County; at Upper Fort Mason,
32 Fort Miley, China Beach, and Fort Funston in San Francisco County; and at Milagra
33 Ridge, Sweeney Ridge, Phleger Estate, and Rancho Corral de Tierra in San Mateo
34 County) would have long-term, minor, adverse, localized impacts on vegetation and
35 wildlife due to the permanent loss of plants and wildlife habitat. Short-term, minor,
36 adverse impacts to vegetation would occur from injury or loss of plants during
37 construction activities; however, the area would be re-planted with native plants and the
38 natural habitat would be reclaimed. Similarly, short-term adverse impacts to wildlife,
39 such as disturbance, would occur during construction.

40 Impacts from NPS educational and stewardship programs would generally be the same as
41 those described in the no-action alternative. Similarly, impacts from vegetation and
42 wildlife management and monitoring activities under alternative 3 would be the same as
43 those described in the no-action alternative. The establishment of a native plant nursery

1 would provide additional capacity to improve native vegetation and wildlife habitat and
2 expand stewardship efforts—a beneficial impact.

3 At Alcatraz Island, adverse impacts to waterbirds under alternative 3 would be greater
4 than those described in the no-action alternative because new visitor amenities (namely
5 food service, modest overnight accommodations, and special events) would cause
6 increased disturbance to nesting waterbirds and human-wildlife conflict. The utilization
7 of Pier 4 at Fort Mason as the primary point of embarkation for visitor transportation to
8 the Island would result in additional impacts to seabirds caused by the proximity of vessel
9 traffic and increased garbage and marine debris. Gulls would be more highly managed in
10 primary visitor use areas, which would take up more of the Island under alternative 3,
11 resulting in disturbance and displacement of gulls. Additionally, the level of historic
12 restoration to the Island (i.e., Parade Grounds, removal of rubble piles, building
13 restoration and adaptive reuse) would cause habitat loss and disturbance to waterbird
14 populations. As in the no-action alternative, the National Park Service would continue to
15 protect nesting and roosting habitats and initiate habitat enhancements in other areas of
16 the island where possible; these actions would result in beneficial impacts. Management
17 zoning on the west side of the island under alternative 3 would protect nesting gulls from
18 visitor use effects. The Model Industries Building and New Industries Building, both of
19 which are proximate to sensitive gull habitat, would be managed in a way that protects
20 gull activity. The marine waters within the vicinity of the colonial nesting birds would be
21 closed to boating during the breeding season, resulting in beneficial impacts. Given the
22 combined effects of disturbance and protective actions, the numbers of breeding pairs of
23 waterbirds on the island could change over time depending on the frequency and intensity
24 of expanded visitor activity, but minimum numbers of nesting pairs would support the
25 maintenance of viable populations. Collectively, these activities would result in long-
26 term, moderate, adverse, localized impacts to waterbirds on the island.

27 ***Conclusion***

28 The development of a sustainable trail system and the elimination of unneeded roads and
29 the restoration of natural vegetation in these areas would result in long-term, minor,
30 beneficial, localized impacts on vegetation and wildlife.

31 The expansion of visitor access and use and the development of new or improved
32 recreational facilities would result in long-term, minor, adverse, and localized impacts.
33 The construction activities related to these developments would result in short-term,
34 minor, and adverse impacts.

35 Natural resource restoration would result in long-term, moderate, beneficial, and
36 localized impacts.

37 Habitat restoration efforts and educational and participatory stewardship programs would
38 result in long-term, minor to moderate, beneficial impacts that would occur both at the
39 local level (habitat restoration) and parkwide(stewardship programs).

40 Impacts to waterbirds on the island would be long-term, moderate, adverse, and localized.

41 Generally, adverse impacts would occur from the presence and maintenance of existing
42 facilities and visitor use. Beneficial impacts would occur from restoration and ongoing
43 management and monitoring activities.

1 No impairment of vegetation or wildlife resources would result from this alternative.

2

3 **Special Status Species (Federal and State Threatened and** 4 **Endangered Species)**

5 ***No Action Alternative***

6 ***Introduction***

7 In general, many of the impacts to vegetation and wildlife described above in the habitat
8 section would apply to special status species. For example, visitor use and new
9 development would result in changes that would have adverse impacts to listed species
10 and their habitats. Likewise, vegetation management and creek restoration would result in
11 beneficial impacts to listed species and their habitats. Keeping this in mind, the analysis
12 provided below generalizes about the effects of land management priorities and, where
13 possible, focuses on the impacts that specific actions included in the alternatives may
14 have on listed species and their habitats.

15 ***Federal Threatened and Endangered Species***

16 **California red-legged frog (*Rana aurora draytonii*).** Wetland restoration and
17 management, such as the project completed at Mori Point, would continue to improve
18 habitat for the frog—resulting in a beneficial impact. Creek restoration in Marin County
19 would improve wetlands and riparian habitat that could serve as potential future habitat
20 for the frog. Exotic plant removal, especially in riparian and wetland areas, could also
21 improve the structure and condition of vegetation that supports frogs. All of these
22 activities should improve and protect breeding and foraging habitat by improving
23 conditions for emergent riparian vegetation and other vegetation conditions preferred by
24 the frog, such as dense, shrubby riparian areas. Controlling and managing visitor use
25 would reduce impacts to frogs, such as habitat alteration and direct impacts from
26 recreational use and development; however, some adverse impacts would continue.
27 Long-term park operations and short-term project specific construction impacts to the
28 species may occur. These may involve “take” associated with removal and translocation
29 of individuals outside construction areas or impacts of existing roadways/trails and their
30 maintenance. The National Park Service would continue to monitor frog populations and
31 survey potential habitat. The primary threat to the frog would continue to be habitat loss –
32 an adverse impact associated with increased urbanization of the region. There has not
33 been any designated critical habitat in Marin or San Mateo counties managed by Golden
34 Gate National Recreation Area (Federal Register 71: 19244-19346). Collectively, impacts
35 to the California red-legged frog resulting from NPS actions that are part of the no-action
36 alternative (the continuation of current management and trends) would be long-term,
37 beneficial, minor, and localized. The determination of effect under Section 7 of the
38 Endangered Species Act would be “*may affect, likely to adversely affect*” for project
39 specific actions in the short-term, and “*may affect, not likely to adversely affect*”
40 for land use and park management over the long-term. Consultation for specific
41 projects would occur as necessary.

42 **Mission blue butterfly (*Icaricia icaroides missionensis*).** Coastal scrub habitat and
43 grassland restoration, including exotic plant removal and vegetation management, in the

1 Marin Headlands and at Milagra Ridge and Sweeney Ridge in San Mateo County, would
2 continue to improve conditions for lupine plants that support Mission blue butterflies.
3 The Marin Headlands-Fort Baker Plan being implemented in cooperation with the
4 Federal Highways Administration would cause some adverse impacts and loss of habitat
5 (which is being mitigated) in the vicinity of Conzelman and Bunker Roads due to
6 construction; however, it would result in long-term benefits to butterfly habitat. The use
7 of prescribed fire, an action analyzed under the Fire Management Plan/EIS, would also
8 continue to have short-term adverse effects on butterflies and butterfly habitat with long-
9 term beneficial effects. Conditions at parklands in San Mateo County, such as the
10 widespread presence of exotic plants, would continue to cause adverse impacts to
11 potential butterfly habitat. Controlling and managing visitor use in known habitat areas
12 throughout the park would reduce impacts to butterflies, such as the trampling of host and
13 nectar plants and direct impacts to larvae and pupae from recreational use and
14 development; however, some adverse impacts would continue. The National Park Service
15 would continue to monitor butterfly populations and survey potential habitat. The
16 primary threat to the butterfly would continue to be habitat loss—resulting in an adverse
17 impact associated with increased urbanization of the region. Collectively, impacts to the
18 Mission blue butterfly resulting from NPS actions that are part of the no-action
19 alternative (the continuation of current management and trends) would be long-term,
20 beneficial, minor, and localized. The determination of effect under Section 7 of the
21 Endangered Species Act would be “*may affect, likely to adversely affect*” for project
22 specific actions in the short-term, and “*may affect, not likely to adversely affect*” for land
23 use and park management over the long-term. Consultation for specific projects would
24 occur as necessary.

25 **Tidewater goby (*Eucyclogobius newberryi*).** Because tidewater gobies are currently
26 only found in Rodeo Lagoon within the planning area, impacts would be restricted to this
27 location. Park Service management of Rodeo Lagoon is compatible with tidewater goby
28 activities and requirements. Throughout its range, the primary threats to gobies include
29 loss and modification of habitat, water diversions, predatory and competitive introduced
30 fish species, habitat channelization, and degraded water quality. NPS activities, such as
31 vegetation management, wetland enhancement, and efforts to improve water quantity and
32 quality within the watershed, near Rodeo Creek would have beneficial impacts on
33 maintaining appropriate habitat characteristics that support gobies in Rodeo Lagoon. The
34 National Park Service would continue to monitor goby populations and habitat and
35 inventory potential habitat. Collectively, impacts to the tidewater goby resulting from
36 NPS actions that are part of the no-action alternative (the continuation of current
37 management and trends) would be long-term, beneficial, minor, and localized. The
38 determination of effect under Section 7 of the Endangered Species Act would be “*may*
39 *affect, likely to adversely affect*” for project specific actions in the short-term, and “*may*
40 *affect, not likely to adversely affect*” for land use and park management over the long
41 term. Consultation for specific projects would occur as necessary.

42 **California brown pelican (*Pelecanus occidentalis californicus*).** California brown
43 pelicans use nearshore marine and estuarine habitats, in addition to beaches, rocky cliffs,
44 and offshore rocks and islands in the park. The protection of primary roost sites at Bird
45 Island, Rodeo Beach/Lagoon, and Seal Rocks in Marin County, and at Alcatraz Island,
46 Lands End and other offshore rocks in San Francisco County, would provide beneficial

1 impacts to California brown pelicans. Park Service restoration activities at Rodeo Lagoon
2 should improve bathing, resting, and roosting habitat—resulting in a beneficial impact.
3 Collectively, impacts to the California brown pelican resulting from NPS actions that are
4 part of the no-action alternative (the continuation of current management and trends)
5 would be long-term, beneficial, minor, and localized. The determination of effect under
6 Section 7 of the Endangered Species Act would be “*may affect, not likely to adversely*
7 *affect.*”

8 **San Francisco garter snake (*Thamnophis sirtalis tetrataenia*).** Because San Francisco
9 garter snakes are currently restricted to localities in San Mateo County (the only
10 documented occurrence is at Mori Point/Sharp Park). Two other locations within the
11 planning area (Milagra Ridge and Rancho Corral de Tierra) appear to have suitable
12 habitat to support breeding populations of San Francisco garter snakes (Swaim Biological
13 Inc. 2006). In addition, two other sites (Sweeny Ridge and Cattle Hill) can provide
14 connectivity between known snake populations or between high quality aquatic habitats
15 that potentially supports San Francisco garter snakes (Swaim Biological Inc. 2006).
16 Therefore, impacts would be restricted to these locations. Because California red-legged
17 frogs are an important prey item for this species, effects on red-legged frogs are expected
18 to have cascading effects on the snake.

19 Wetland restoration and management at Mori Point could have short-term adverse
20 impacts on California red-legged frogs and the San Francisco garter snake, but would
21 result in long-term habitat improvements—a beneficial impact. Some types of exotic tree
22 removal would also improve the structure and condition of habitat that supports snakes.
23 Controlling and managing visitor use would reduce impacts to snakes, such as habitat
24 alteration and direct impacts from recreational use and development; however, some
25 adverse impacts would continue. The National Park Service would continue to monitor
26 snake populations and survey potential habitat—resulting in a beneficial impact. The
27 primary threat to the snake would continue to be habitat loss and alteration—an adverse
28 impact associated with increased urbanization of the region. Collectively, impacts to the
29 San Francisco garter snake resulting from NPS actions that are part of the no-action
30 alternative (the continuation of current management and trends) would be long-term,
31 beneficial, minor to moderate, and localized. The determination of effect under Section 7
32 of the Endangered Species Act would be “*may affect, likely to adversely affect*” for
33 project specific actions in the short-term, and “*may affect, not likely to adversely affect*”
34 for land use and park management over the long-term. Consultation for specific projects
35 would occur as necessary.

36 **San Bruno elfin butterfly (*Callophrys mossii bayensis*).** Because the San Bruno elfin
37 butterfly is currently only known to occur at Milagra Ridge within the planning area,
38 impacts would be restricted to this location. Other suitable habitat may be present at other
39 locations in San Mateo County.

40 Exotic plant removal and vegetation management would continue to improve conditions
41 for *Sedum spathulifolium*, the succulent plant that hosts butterfly larvae. Controlling and
42 managing visitor use in known habitat areas would reduce impacts to butterflies, such as
43 the trampling of host plants and direct impacts to larvae and pupae from recreational use
44 and development; however, some adverse impacts would continue. The National Park
45 Service would continue to monitor butterfly populations and survey potential habitat—

1 resulting in a beneficial impact. The primary threat to the butterfly would continue to be
2 habitat loss—an adverse impact associated with increased urbanization of the region.
3 Collectively, impacts to the San Bruno elfin butterfly resulting from NPS actions that are
4 part of the no-action alternative (the continuation of current management and trends)
5 would be long-term, beneficial, minor, and localized. The determination of effect under
6 Section 7 of the Endangered Species Act would be “*may affect, not likely to adversely*
7 *affect.*”

8 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead trout,**
9 **Central California Coast (*O. mykiss*).** These two listed salmonid species are analyzed
10 together because of the similarities in their life characteristics, habitat requirements, and
11 the effects of impacts on the two species.

12 Coho salmon are restricted to Redwood Creek and Eastkoot Creek in Marin County,
13 estuarine sites such as Bolinas Lagoon, as well as the nearshore waters of the Pacific
14 Ocean. Steelhead trout are restricted to Redwood Creek and the drainages to Bolinas
15 Lagoon and Rodeo Lagoon in Marin County; and West Union Creek, a tributary to San
16 Francisquito Creek, in San Mateo County. Therefore, impacts would be restricted to these
17 locations.

18 NPS activities, such as vegetation management, creek restoration, and efforts to improve
19 water quantity and quality within the Redwood Creek watershed, would have beneficial
20 impacts on maintaining habitat characteristics that support anadromous fish. Projects in
21 Marin County at the Lower Redwood Creek property (floodplain restoration), Big
22 Lagoon (estuarine and wetland restoration), Stinson Beach (stream and wetland
23 restoration) and Muir Woods National Monument (vegetation management) would have
24 beneficial impacts on habitat parameters required by the two species. These projects
25 would improve riparian vegetation and in-stream habitat complexity—resulting in
26 improvements to spawning, rearing, and migratory habitats. Critical habitat would be
27 affected by restoration activities. Within the immediate project area, short-term, minor,
28 adverse, localized impacts to nearly all essential features of critical habitat (substrate,
29 water quality, water quantity, water temperature, water velocity, cover/shelter, food,
30 riparian vegetation, space, and safe passage conditions) would be expected. However,
31 these short-term impacts would be outweighed by the beneficial impacts expected to
32 occur over the long-term. The National Park Service would continue to monitor coho and
33 steelhead populations and habitat inventory potential habitat.

34 Controlling and managing visitor use would reduce impacts to coho and steelhead, such
35 as habitat alteration and direct impacts from recreational use and development; however,
36 some adverse impacts would continue. The primary threats to coho and steelhead would
37 continue to be loss and modification of habitat, water diversions, habitat channelization,
38 sedimentation, and degraded water quality—adverse impacts associated with increased
39 urbanization of the region. Collectively, impacts to coho salmon and steelhead trout
40 resulting from NPS actions that are part of the no-action alternative (the continuation of
41 current management and trends) would be long-term, beneficial, minor, and localized.
42 The determination of effect under Section 7 of the Endangered Species Act would be
43 “*may affect, likely to adversely affect*” for project specific actions in the short-term, and
44 “*may affect, not likely to adversely affect*” for land use and park management over the
45 long-term. Consultation for specific projects would occur as necessary.

1 **Western snowy plover (*Charadrius alexandrinus nivosus*).** The western snowy plover
2 nests in coastal Marin County at Point Reyes National Seashore and Dillon Beach.
3 Nonbreeding snowy plovers regularly use habitat within the planning area at Ocean
4 Beach. Snowy plovers are occasionally observed at Rodeo Beach, though these birds tend
5 to remain only for short periods of time. Therefore, impacts would be restricted to these
6 locations.

7 Seasonal visitor use restrictions requiring dogs to be on leash on a portion of Ocean
8 Beach would continue to assist in the protection of plovers—resulting in a beneficial
9 impact. However, visitor use (especially dogs off-leash) would continue to disturb
10 foraging or roosting birds resulting in long-term, minor, adverse, localized impacts. The
11 National Park Service would continue to restrict park management activities in plover
12 habitat, provide guidance for beach patrol activities, and is currently developing a
13 shorebird plover docent program—all of which assist with plover protection and provide
14 beneficial impacts. The National Park Service would continue to monitor plover
15 populations and survey potential habitat. The primary threat to the plover within the
16 region would continue to be habitat loss—an adverse impact associated with increased
17 urbanization of the region and the loss or alteration of beach habitat. Collectively,
18 impacts to the western snowy plover resulting from NPS actions that are part of the no-
19 action alternative (the continuation of current management and trends) would be long-
20 term, minor, adverse, and localized. The determination of effect under Section 7 of the
21 Endangered Species Act would be “*may affect, likely to adversely affect.*”

22 **Northern spotted owl (*Strix occidentalis caurina*).** Suitable habitat for northern spotted
23 owls includes all evergreen forested habitat north of Highway 1 in Marin County. Within
24 the planning area, known spotted owl populations are currently limited to Muir Woods
25 National Monument, Homestead Valley, and the Stinson Gulch area. Therefore, impacts
26 would be restricted to these locations.

27 Vegetation management actions designed to protect and enhance coniferous forest,
28 including old-growth, second growth and remnant stands, would provide potential
29 roosting, feeding, and nesting habitat for the owl—resulting in a beneficial impact. The
30 National Park Service would continue to monitor owl populations and survey potential
31 habitat. Visitor use in the area would continue to disturb owls. Barred owls would also
32 likely continue to invade preferred spotted owl habitats—an adverse impact. Ongoing
33 actions to reduce human-created noise and light at Muir Woods National Monument
34 would result in improvements to habitat conditions. Current actions to reduce barred owl
35 use and nesting would help reduce adverse impacts to spotted owls. The primary threat to
36 the northern spotted owl in the region would continue to be the loss of habitat – an
37 adverse impact associated with increased urbanization of the region. Other threats include
38 expansion in the range of the barred owl (*Strix varia*), West Nile virus, changes in habitat
39 due to Sudden Oak Death, and recreational pressure. Locally, in Muir Woods National
40 Monument, the primary threat is from barred owls. Collectively, impacts to the northern
41 spotted owl resulting from NPS actions that are part of the no-action alternative (the
42 continuation of current management and trends) would be long-term, minor, beneficial
43 and localized. The determination of effect under Section 7 of the Endangered Species Act
44 would be “*may affect, not likely to adversely affect.*”

1 **San Francisco lessingia (*Lessingia germanorum*).** Vegetation management, including
2 exotic plant removal, would continue to improve conditions for the San Francisco
3 lessingia. Restoration projects at Fort Funston (about 20 acres of ice plant removal) in
4 areas that should contain open sandy soils and dunes would reduce competition with
5 nonnative vegetation—resulting in a beneficial impact. Controlling and managing visitor
6 use in known habitat areas would reduce impacts to the lessingia, such as the trampling of
7 plants; however, some adverse impacts would continue. The National Park Service would
8 continue to monitor lessingia populations and survey potential habitat—resulting in a
9 beneficial impact. The primary threat to the lessingia would continue to be habitat loss—
10 an adverse impact associated with increased urbanization of the region—and habitat
11 alteration resulting in increases in invasive, nonnative plants. Collectively, impacts to the
12 San Francisco lessingia resulting from NPS actions that are part of the no-action
13 alternative (the continuation of current management and trends) would be long-term,
14 beneficial, minor, and localized. The determination of effect under Section 7 of the
15 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

16 ***State Threatened and Endangered Species***

17 **Bank swallow (*Riparia riparia*).** The only known nesting location for bank swallows
18 within the park is in the coastal bluffs at Fort Funston. The National Park Service would
19 continue to maintain natural geologic processes that erode the cliffs and provide suitable
20 nesting habitat—resulting in a beneficial impact. Visitor use in the vicinity of the nest
21 sites, as well as the defacing of the sandy cliffs themselves, would continue to disturb
22 individual birds and affect nesting activity and success—an adverse impact. The National
23 Park Service would continue to monitor bank swallow populations and survey potential
24 habitat—resulting in a beneficial impact. The primary threat to the bank swallow would
25 continue to be habitat loss—resulting in an adverse impact associated with increased
26 urbanization, conversion of natural habitats, and channelization of waterways in the
27 region. Collectively, impacts to the bank swallow resulting from NPS actions that are part
28 of the no-action alternative (the continuation of current management and trends) would
29 be long-term, beneficial, minor, and localized.

30 **Montara Manzanita (*Arctostaphylos montaraensis*).** The Montara manzanita is
31 endemic to the slopes of Montara Mountain in San Mateo County. Most of the known
32 habitat is located in McNee Ranch State Park, outside of NPS-owned lands; therefore,
33 any impacts would be restricted to this location. No actions included in this alternative
34 would have any impact on the Montara manzanita or its habitat.

35

1 **Conclusion**2 **Table 14: Potential Impacts to Special Status Species of Golden Gate National Recreation**
3 **Area, No-action Alternative**

Species	Status	ESA Determination
California red-legged frog (<i>Rana aurora draytonii</i>)	Federal threatened	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and park management over the long-term
Mission blue butterfly (<i>Icaricia icaroides missionensis</i>)	Federal endangered	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and park management over the long-term
Tidewater goby (<i>Eucyclogobius newberryi</i>)	Federal endangered	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and park management over the long-term
California brown pelican (<i>Pelecanus occidentalis californicus</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Francisco garter snake (<i>Thamnophis sirtalis tetrataenia</i>)	Federal endangered	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and park management over the long-term
San Bruno elfin butterfly (<i>Callophrys mossii bayensis</i>)	Federal endangered	"may affect, not likely to adversely affect"
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and park management over the long-term

Species	Status	ESA Determination
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Federal threatened	"may affect, likely to adversely affect"
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	"may affect, not likely to adversely affect"
San Francisco lessingia (<i>Lessingia germanorum</i>)	Federal endangered	"may affect, not likely to adversely affect"
Bank swallow (<i>Riparia riparia</i>)	Federal candidate; State threatened	long-term, beneficial, minor, and localized
Montara Manzanita (<i>Arctostaphylos montaraensis</i>)	State threatened	no impact

1

2 No impairment of listed species would result from this alternative.

3 **Alternative 1: Connecting People with the Parks**
 4 **(NPS Preferred Alternative for park sites in Marin, San Francisco, and**
 5 **San Mateo counties)**

6 **Introduction**

7 Under alternative 1, a variety of management zones would be used that would assist in
 8 the protection of special status species. Approximately 77% of the park would be zoned
 9 using the Natural and Sensitive Resources zones.

10 **Federal Threatened and Endangered Species**

11 **California red-legged frog (*Rana aurora draytonii*).** Impacts to California red-legged
 12 frogs and their habitat from alternative 1 would be the same as the no-action alternative
 13 with the exception of impacts to habitat from expanded restoration of natural areas.
 14 Vegetation management, including exotic plant removal, especially in riparian and
 15 wetland areas in San Mateo County, would be greater than under the no-action
 16 alternative, creating improvements to vegetative structure and condition that could
 17 improve breeding and foraging habitat—resulting in a beneficial impact. Impacts to the
 18 frog from new recreational development under alternative 1 would not occur because any
 19 new facilities would be sited to avoid existing or potential frog habitat. Impacts to the
 20 California red-legged frog resulting from NPS actions that are part of the alternative 1
 21 would be long-term, beneficial, minor, and localized. The determination of effect under
 22 Section 7 of the Endangered Species Act would be "may affect, not likely to adversely
 23 affect."

24 **Mission blue butterfly (*Icaricia icaroides missionensis*).** Impacts to mission blue
 25 butterflies and their habitat from alternative 1 would be the same as the no-action

1 alternative with the exception of vegetation management actions in San Mateo County
2 and new recreational development in San Mateo and Marin counties. Vegetation
3 management, including exotic plant removal, in San Mateo County parklands would
4 improve conditions that support the host lupine—resulting in a beneficial impact.
5 However, increased visitor use in this area could also cause adverse impacts to host
6 plants and butterfly larvae and pupae. New recreational development in known habitat in
7 Marin and San Mateo counties would slightly increase the adverse impacts that are
8 described under the no-action alternative. Impacts to the Mission blue butterfly resulting
9 from NPS actions that are part of alternative 1 would be long-term, beneficial, minor, and
10 localized. The determination of effect under Section 7 of the Endangered Species Act
11 would be “*may affect, not likely to adversely affect.*”

12 **Tidewater goby (*Eucyclogobius newberryi*).** Impacts to tidewater gobies and their
13 habitat from alternative 1 would be the same as the no-action alternative. Impacts to the
14 tidewater goby resulting from NPS actions that are part of alternative 1 would be long-
15 term, beneficial, minor, and localized. The determination of effect under Section 7 of the
16 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

17 **California brown pelican (*Pelecanus occidentalis californicus*).** Impacts to California
18 brown pelicans and their habitat from alternative 1 would be the same as the no-action
19 alternative. The determination of effect under Section 7 of the Endangered Species Act
20 would be “*may affect, not likely to adversely affect.*”

21 **San Francisco garter snake (*Thamnophis sirtalis tetrataenia*).** Impacts to the San
22 Francisco garter snake and their habitat under alternative 1 would be the same as under
23 the no-action alternative with the exception of habitat improvements in San Mateo
24 County. Vegetation management, including exotic plant removal in riparian and wetland
25 areas, would improve the structure and condition of vegetation that supports snakes—
26 resulting in a beneficial impact. Impacts to the San Francisco garter snake resulting from
27 NPS actions that are part of alternative 1 would be long-term, beneficial, minor to
28 moderate, and localized. The determination of effect under Section 7 of the Endangered
29 Species Act would be “*may affect, not likely to adversely affect.*”

30 **San Bruno elfin butterfly (*Callophrys mossii bayensis*).** Impacts to the San Bruno elfin
31 butterfly and their habitat under alternative 1 would be the same as under the no-action
32 alternative, with the exception of habitat improvements at Milagra Ridge and other
33 parklands in San Mateo County. Habitat restoration activities at Milagra Ridge (including
34 earthwork and native plantings covering about 20 acres) could improve conditions for
35 host plant recruitment and butterfly use. Vegetation management, including exotic plant
36 removal, elsewhere in San Mateo County would improve the structure and condition of
37 vegetation and could increase the potential for local range expansion into additional
38 suitable habitat—resulting in a beneficial impact. Impacts to the San Bruno elfin butterfly
39 resulting from NPS actions that are part of alternative 1 would be long-term, beneficial,
40 minor to moderate, and localized. The determination of effect under Section 7 of the
41 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

42 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
43 **trout, Central California Coast (*O. mykiss*).** Adverse impacts to coho salmon and
44 steelhead trout and their habitat would be the same as those described under the no-action

1 alternative. The types of beneficial impacts described under the no-action alternative
2 would be the same under alternative 1 but the scale would be greater, resulting in
3 increased beneficial impacts. Restoration activities in the Redwood Creek watershed in
4 Marin County and at various creeks within San Mateo County would improve habitat
5 characteristics that support anadromous fish. The goal of reconnecting creeks to the
6 ocean on San Mateo County park lands, and partnering with CalTrans to improve fish
7 passage, would provide the habitat required to support the life cycle of these anadromous
8 fish—resulting in a beneficial impact. Impacts to coho salmon and steelhead trout
9 resulting from NPS actions that are part of alternative 1 would be long-term, beneficial,
10 moderate, and localized. The determination of effect under Section 7 of the Endangered
11 Species Act would be “*may affect, not likely to adversely affect.*”

12 **Western snowy plover (*Charadrius alexandrinus nivosus*).** Impacts to Western snowy
13 plover and their habitat from alternative 1 would be the same as the no-action alternative.
14 The determination of effect under Section 7 of the Endangered Species Act would be
15 “*may affect, not likely to adversely affect.*”

16 **Northern spotted owl (*Strix occidentalis caurina*).** Impacts to northern spotted owls and
17 their habitat from alternative 1 would be the same as the no-action alternative with the
18 exception of habitat improvements near Stinson Beach. Creek restoration near Stinson
19 Beach would improve habitat conditions for species such as small mammals and
20 songbirds, which are the primary prey species of the spotted owl. Impacts to the northern
21 spotted owl would be long-term, minor, beneficial, and localized. The determination of
22 effect under Section 7 of the Endangered Species Act would be “*may affect, not likely to*
23 *adversely affect.*”

24 **San Francisco lessingia (*Lessingia germanorum*).** Adverse impacts to the San
25 Francisco lessingia and its habitat would be the same as those described under the no-
26 action alternative. The types of beneficial impacts described under the no-action
27 alternative would be the same under alternative 1, but the scale would be greater,
28 resulting in increased beneficial impacts due to expanded vegetation management and
29 native plant habitat restoration. Impacts to the San Francisco lessingia resulting from
30 NPS actions that are part of alternative 1 would be long-term, beneficial, minor, and
31 localized. The determination of effect under Section 7 of the Endangered Species Act
32 would be “*may affect, not likely to adversely affect.*”

33 ***State Threatened and Endangered Species***

34 **Bank swallow (*Riparia riparia*).** Impacts to bank swallows and their habitat from
35 alternative 1 would be the same as the no-action alternative. Impacts would be long-term,
36 beneficial, minor, and localized.

37 **Montara Manzanita (*Arctostaphylos montaraensis*).** The Montara manzanita is
38 endemic to the slopes of Montara Mountain in San Mateo County. Most of the known
39 habitat is located in McNee Ranch State Park, outside of NPS-owned lands. Limited
40 surveying of known populations and potential habitat outside of this area has been
41 conducted.

42 Under alternative 1, the National Park Service would acquire lands in San Mateo County.
43 In particular, the Ranch Corral de Tierra property, which is adjacent to McNee Ranch

1 State Park, would be acquired. Impacts to the Montara manzanita could occur from
 2 visitor use and habitat restoration. Increased visitor use in San Mateo County, in
 3 particular at Ranch Corral de Tierra which is adjacent McNee Ranch, could cause
 4 increased erosion and trampling of plants along trails in the Montara Mountain area—
 5 resulting in a long-term, minor to moderate, adverse, localized impact. Habitat restoration
 6 in this area could also improve conditions for this rare plant (a beneficial impact), but
 7 would not likely result in range expansion or an increase in individual plants due to the
 8 specific habitat requirements of the species. The National Park Service would monitor
 9 Montara Manzanita populations and survey potential habitat and would manage visitor
 10 use and construction activities within known habitat to avoid or minimize impacts the
 11 species—resulting in beneficial impacts. Collectively, impacts to the Montara manzanita
 12 or its habitat from alternative 1 would be long-term, minor, adverse, and localized.

13 **Conclusion**

14 **Table 15 : Potential Impacts to Special Status Species of Golden Gate National Recreation**
 15 **Area, Alternative 1**

Species	Status	ESA Determination
California red-legged frog (<i>Rana aurora draytonii</i>)	Federal threatened	"may affect, not likely to adversely affect"
Mission blue butterfly (<i>Icaricia icaroides missionensis</i>)	Federal endangered	"may affect, not likely to adversely affect"
Tidewater goby (<i>Eucyclogobius newberryi</i>)	Federal endangered	"may affect, not likely to adversely affect"
California brown pelican (<i>Pelecanus occidentalis californicus</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Francisco garter snake (<i>Thamnophis sirtalis tetrataenia</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Bruno elfin butterfly (<i>Callophrys mossii bayensis</i>)	Federal endangered	"may affect, not likely to adversely affect"
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	"may affect, not likely to adversely affect"

Species	Status	ESA Determination
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Federal threatened	"may affect, not likely to adversely affect."
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	"may affect, not likely to adversely affect"
San Francisco lessingia (<i>Lessingia germanorum</i>)	Federal endangered	"may affect, not likely to adversely affect"
Bank swallow (<i>Riparia riparia</i>)	Federal candidate; State threatened	long-term, beneficial, minor, and localized
Montara Manzanita (<i>Arctostaphylos montaraensis</i>)	State threatened	long-term, minor, adverse, and localized

1

2 No impairment of listed species would result from this alternative.

3 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

4 **Introduction**

5 Under alternative 2, a variety of management zones would be used that would assist in
6 the protection of special status species. Approximately 92% of the park would be zoned
7 using the Natural and Sensitive Resources zones.

8 **Federal Threatened and Endangered Species**

9 **California red-legged frog (*Rana aurora draytonii*).** Impacts to California red-legged
10 frogs and their habitat from alternative 2 would be the same as the no-action alternative
11 with the exception of impacts to habitat from expanded restoration of natural areas.
12 Vegetation management, including exotic plant removal, especially in riparian and
13 wetland areas in Marin and San Mateo counties, would be greater than under the no-
14 action alternative resulting in improvements to vegetative structure and condition that
15 could improve breeding and foraging habitat—resulting in a beneficial impact. Impacts to
16 the frog from new recreational development under alternative 2 would not occur because
17 any new facilities would be sited to avoid existing or potential frog habitat. Impacts to the
18 California red-legged frog resulting from NPS actions that are part of the alternative 2
19 would be long-term, beneficial, minor, and localized. The determination of effect under
20 Section 7 of the Endangered Species Act would be "may affect, not likely to adversely
21 affect."

22 **Mission blue butterfly (*Icaricia icaroides missionensis*).** Impacts to mission blue
23 butterflies and their habitat from alternative 2 would be the same as those of the no-action
24 alternative, with the exception of impacts resulting from vegetation management actions
25 and new recreation development in San Mateo County and from park land use in Marin

1 County. Vegetation management, including exotic plant removal, in San Mateo County
2 park lands would improve conditions that support the host lupine—resulting in a
3 beneficial impact. However, increased visitor use in this area could also cause adverse
4 impacts to host plants and butterfly larvae and pupae. New recreational development in
5 known habitat in San Mateo County would slightly increase the adverse impacts that are
6 described under the no-action alternative. Management zoning of known habitat in Marin
7 County would provide greater protection of butterfly habitat than under the no-action
8 alternative—creating a beneficial impact. Impacts to the Mission blue butterfly resulting
9 from NPS actions that are part of alternative 2 would be long-term, beneficial, minor, and
10 localized. The determination of effect under Section 7 of the Endangered Species Act
11 would be “*may affect, not likely to adversely affect.*”

12 **Tidewater goby (*Eucyclogobius newberryi*).** Impacts to tidewater gobies and their
13 habitat from alternative 2 would be the same as the no-action alternative, with the
14 exception of greater beneficial impacts resulting from expanded restoration efforts and
15 watershed protection. Impacts to the tidewater goby resulting from NPS actions that are
16 part of alternative 2 would be long-term, beneficial, minor, and localized. The
17 determination of effect under Section 7 of the Endangered Species Act would be “*may*
18 *affect, not likely to adversely affect.*”

19 **California brown pelican (*Pelecanus occidentalis californicus*).** Impacts to California
20 brown pelicans and their habitat from alternative 2 would be the same as the no-action
21 alternative. The determination of effect under Section 7 of the Endangered Species Act
22 would be “*may affect, not likely to adversely affect.*”

23 **San Francisco garter snake (*Thamnophis sirtalis tetrataenia*).** Impacts to the San
24 Francisco garter snake and their habitat under alternative 2 would be the same as under
25 the no-action alternative, with the exception of impacts created by habitat improvements
26 in San Mateo County. Vegetation management, including exotic plant removal in riparian
27 and wetland areas, would improve the structure and condition of vegetation that supports
28 snakes—resulting in a beneficial impact. Impacts to the San Francisco garter snake
29 resulting from NPS actions that are part of alternative 2 would be long-term, beneficial,
30 minor to moderate, and localized. The determination of effect under Section 7 of the
31 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

32 **San Bruno elfin butterfly (*Callophrys mossii bayensis*).** Impacts to the San Bruno elfin
33 butterfly and their habitat under alternative 2 would be the same as under the no-action
34 alternative, with the exception of habitat improvements at Milagra Ridge and other
35 parklands in San Mateo County. Habitat restoration activities at Milagra Ridge (including
36 earthwork and native plantings covering about 20 acres) could improve conditions for
37 host plant recruitment and butterfly use. Vegetation management, including exotic plant
38 removal, elsewhere in San Mateo County would improve the structure and condition of
39 vegetation and could increase the potential for local range expansion into additional
40 suitable habitat—resulting in a beneficial impact. Impacts to the San Bruno elfin butterfly
41 resulting from NPS actions that are part of alternative 2 would be long-term, beneficial,
42 minor to moderate, and localized. The determination of effect under Section 7 of the
43 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

1 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
2 **trout, Central California Coast (*O. mykiss*).** Adverse impacts to coho salmon and
3 steelhead trout and their habitat would be the same as those described under the no-action
4 alternative. The types of beneficial impacts described under the no-action alternative
5 would be the same under alternative 2 but the scale would be greater, resulting in
6 increased beneficial impacts. Restoration activities in the Redwood Creek watershed in
7 Marin County and at various creeks within San Mateo County would improve habitat
8 characteristics that support anadromous fish. The goal of reconnecting creeks to the
9 ocean on San Mateo County parklands, and partnering with CalTrans to improve fish
10 passage, would provide the habitat required to support the life cycle of these anadromous
11 fish—resulting in a beneficial impact. Impacts to coho salmon and steelhead trout
12 resulting from NPS actions that are part of alternative 2 would be long-term, beneficial,
13 moderate, and localized. The determination of effect under Section 7 of the Endangered
14 Species Act would be “*may affect, not likely to adversely affect.*”

15 **Western snowy plover (*Charadrius alexandrinus nivosus*).** Impacts to Western snowy
16 plover and their habitat from alternative 2 would be the same as the no-action alternative.
17 The determination of effect under Section 7 of the Endangered Species Act would be
18 “*may affect, not likely to adversely affect.*”

19 **Northern spotted owl (*Strix occidentalis caurina*).** Impacts to northern spotted owls and
20 their habitat from alternative 2 would be the same as the no-action alternative with the
21 exception of habitat improvements near Stinson Beach. Creek restoration near Stinson
22 Beach would improve habitat conditions for species such as small mammals and
23 songbirds, which are the primary prey species of the spotted owl. Impacts to the northern
24 spotted owl would be long-term, minor, beneficial, and localized. The determination of
25 effect under Section 7 of the Endangered Species Act would be “*may affect, not likely to*
26 *adversely affect.*”

27 **San Francisco lessingia (*Lessingia germanorum*).** Adverse impacts to the San
28 Francisco lessingia and its habitat would be the same as those described under the no-
29 action alternative. The types of beneficial impacts described under the no-action
30 alternative would be the same under alternative 2 but the scale would be greater, resulting
31 in increased beneficial impacts due to expanded vegetation management and native plant
32 habitat restoration. The removal of nonhistoric buildings at Fort Funston would provide
33 an opportunity to restore dune habitat and create an area of expansion for the lessingia.
34 Impacts to the San Francisco lessingia resulting from NPS actions that are part of
35 alternative 2 would be long-term, beneficial, minor, and localized. The determination of
36 effect under Section 7 of the Endangered Species Act would be “*may affect, not likely to*
37 *adversely affect.*”

38 ***State Threatened and Endangered Species***

39 **Bank swallow (*Riparia riparia*).** Impacts to bank swallows and their habitat from
40 alternative 1 would be the same as the no-action alternative. Impacts would be long-term,
41 beneficial, minor, and localized.

42 **Montara Manzanita (*Arctostaphylos montaraensis*).** The Montara manzanita is
43 endemic to the slopes of Montara Mountain in San Mateo County. Most of the known
44 habitat is located in McNee Ranch State Park, outside of NPS-owned lands. Limited

1 surveying of known populations and potential habitat outside of this area has been
 2 conducted.

3 Under alternative 2, the National Park Service would acquire lands in San Mateo County.
 4 In particular, the Ranch Corral de Tierra property, which is adjacent to McNee Ranch
 5 State Park, would be acquired. Impacts to the Montara manzanita could occur from
 6 visitor use and habitat restoration. Increased visitor use in San Mateo County, in
 7 particular at Ranch Corral de Tierra, which is adjacent McNee Ranch, could cause
 8 increased erosion and trampling of plants along trails in the Montara Mountain area—
 9 resulting in a long-term, minor to moderate, adverse, localized impact. Habitat restoration
 10 in this area could also improve conditions for this rare plant (a beneficial impact), but
 11 would not likely result in range expansion or an increase in individual plants due to the
 12 specific habitat requirements of the species. The National Park Service would monitor
 13 Montara manzanita populations and survey potential habitat and would manage visitor
 14 use and construction activities within known habitat to avoid or minimize impacts the
 15 species—resulting in beneficial impacts. Collectively, impacts to the Montara manzanita
 16 or its habitat from alternative 2 would be long-term, minor, adverse, and localized.

17 **Conclusion**

18 **Table 16: Potential Impacts to Special Status Species of Golden Gate National Recreation**
 19 **Area, Alternative 2**

Species	Status	ESA Determination
California red-legged frog (<i>Rana aurora draytonii</i>)	Federal threatened	"may affect, not likely to adversely affect"
Mission blue butterfly (<i>Icaricia icaroides missionensis</i>)	Federal endangered	"may affect, not likely to adversely affect"
Tidewater goby (<i>Eucyclogobius newberryi</i>)	Federal endangered	"may affect, not likely to adversely affect"
California brown pelican (<i>Pelecanus occidentalis californicus</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Francisco garter snake (<i>Thamnophis sirtalis tetrataenia</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Bruno elfin butterfly (<i>Callophrys mossii bayensis</i>)	Federal endangered	"may affect, not likely to adversely affect"

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	"may affect, not likely to adversely affect"
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Federal threatened	"may affect, not likely to adversely affect."
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	"may affect, not likely to adversely affect"
San Francisco lessingia (<i>Lessingia germanorum</i>)	Federal endangered	"may affect, not likely to adversely affect"
Bank swallow (<i>Riparia riparia</i>)	Federal candidate; State threatened	long-term, beneficial, minor, and localized
Montara Manzanita (<i>Arctostaphylos montaraensis</i>)	State threatened	long-term, minor, adverse, and localized

1

2 No impairment of listed species would result from this alternative.

3 **Alternative 3: Focusing on National Treasures**
 4 **(NPS Preferred Alternative for Alcatraz Island)**

5 **Introduction**

6 Under alternative 3, a variety of management zones would be used that would assist in
 7 the protection of special status species. Approximately 88% of the park would be zoned
 8 using the Natural and Sensitive Resources zones.

9 **Federal Threatened and Endangered**

10 **California red-legged frog (*Rana aurora draytonii*).** Impacts to California red-legged
 11 frogs and their habitat from alternative 3 would be the same as the no-action alternative
 12 with the exception of impacts to habitat from expanded restoration of natural areas.
 13 Vegetation management, including exotic plant removal, especially in riparian and
 14 wetland areas in San Mateo County, would be greater than under the no-action
 15 alternative, creating improvements to vegetative structure and condition that could
 16 improve breeding and foraging habitat—resulting in a beneficial impact. Impacts to the
 17 frog from new recreational development under alternative 3 would not occur because any
 18 new facilities would be sited to avoid existing or potential frog habitat. Impacts to the
 19 California red-legged frog resulting from NPS actions that are part of the alternative 3

1 would be long-term, beneficial, minor, and localized. The determination of effect under
2 Section 7 of the Endangered Species Act would be “*may affect, not likely to adversely*
3 *affect.*”

4 **Mission blue butterfly (*Icaricia icaroides missionensis*).** Impacts to mission blue
5 butterflies and their habitat from alternative 3 would be the same as the no-action
6 alternative with the exception of vegetation management actions and new recreational
7 development in San Mateo County, and park land uses in Marin County. Vegetation
8 management, including exotic plant removal, in San Mateo County parklands would
9 improve conditions that support the host lupine—a beneficial impact. However, increased
10 visitor use in this area could also cause adverse impacts to host plants and butterfly larvae
11 and pupae. New recreational development in known habitat in Marin and San Mateo
12 counties would slightly increase the adverse impacts that are described under the no-
13 action alternative. Treatments to restore cultural landscapes in known habitat in Marin
14 County could have adverse impacts (i.e. loss or conversion of habitat) on native coastal
15 shrub habitats and grasslands that support lupine and butterflies; however, butterfly
16 habitat protection objectives would be included in any plans to change existing conditions
17 in this area. Impacts to the Mission blue butterfly resulting from NPS actions that are part
18 of alternative 3 would be long-term, adverse, minor, and localized. The determination of
19 effect under Section 7 of the Endangered Species Act would be “*may affect, not likely to*
20 *adversely affect.*”

21 **Tidewater goby (*Eucyclogobius newberryi*).** Impacts to tidewater gobies and their
22 habitat from alternative 3 would be the same as the no-action alternative. Impacts to the
23 tidewater goby resulting from NPS actions that are part of alternative 3 would be long-
24 term, beneficial, minor, and localized. The determination of effect under Section 7 of the
25 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

26 **California brown pelican (*Pelecanus occidentalis californicus*).** Impacts to California
27 brown pelicans and their habitat from alternative 3 would be the same as the no-action
28 alternative. The determination of effect under Section 7 of the Endangered Species Act
29 would be “*may affect, not likely to adversely affect.*”

30 **San Francisco garter snake (*Thamnophis sirtalis tetrataenia*).** Impacts to the San
31 Francisco garter snake and their habitat under alternative 3 would be the same as under
32 the no-action alternative with the exception of habitat improvements in San Mateo
33 County. Vegetation management, including exotic plant removal in riparian and wetland
34 areas, would improve the structure and condition of vegetation that supports snakes—a
35 beneficial impact. Impacts to the San Francisco garter snake resulting from NPS actions
36 that are part of alternative 3 would be long-term, beneficial, minor to moderate, and
37 localized. The determination of effect under Section 7 of the Endangered Species Act
38 would be “*may affect, not likely to adversely affect.*”

39 **San Bruno elfin butterfly (*Callophrys mossii bayensis*).** Impacts to the San Bruno elfin
40 butterfly and their habitat under alternative 3 would be the same as under the no-action
41 alternative, with the exception of habitat improvements at Milagra Ridge and other
42 parklands in San Mateo County. Habitat restoration activities at Milagra Ridge (including
43 earthwork and native plantings covering about 20 acres) could improve conditions for
44 host plant recruitment and butterfly use. Vegetation management, including exotic plant

1 removal, elsewhere in San Mateo County would improve the structure and condition of
2 vegetation and could increase the potential for local range expansion into additional
3 suitable habitat—resulting in a beneficial impact. Impacts to the San Bruno elfin butterfly
4 resulting from NPS actions that are part of alternative 3 would be long-term, beneficial,
5 minor to moderate, and localized. The determination of effect under Section 7 of the
6 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

7 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
8 **trout, Central California Coast (*O. mykiss*).** Adverse impacts to coho salmon and
9 steelhead trout and their habitat would be the same as those described under the no-action
10 alternative. The types of beneficial impacts described under the no-action alternative
11 would be the same under alternative 3 but the scale would be greater, resulting in
12 increased beneficial impacts. Restoration activities in the Redwood Creek watershed in
13 Marin County and at various creeks within San Mateo County would improve habitat
14 characteristics that support anadromous fish. The goal of reconnecting creeks to the
15 ocean on San Mateo County parklands, and partnering with CalTrans to improve fish
16 passage, would provide the habitat required to support the life cycle of these anadromous
17 fish—a beneficial impact. Impacts to coho salmon and steelhead trout resulting from NPS
18 actions that are part of alternative 3 would be long-term, beneficial, moderate, and
19 localized. The determination of effect under Section 7 of the Endangered Species Act
20 would be “*may affect, not likely to adversely affect.*”

21 **Western snowy plover (*Charadrius alexandrinus nivosus*).** Impacts to Western snowy
22 plover and their habitat from alternative 3 would be the same as the no-action alternative.
23 The determination of effect under Section 7 of the Endangered Species Act would be
24 “*may affect, not likely to adversely affect.*”

25 **Northern spotted owl (*Strix occidentalis caurina*).** Impacts to northern spotted owls and
26 their habitat from alternative 3 would be the same as the no-action alternative. The
27 determination of effect under Section 7 of the Endangered Species Act would be “*may*
28 *affect, not likely to adversely affect.*”

29 **San Francisco lessingia (*Lessingia germanorum*).** Adverse impacts to the San
30 Francisco lessingia and its habitat would be the same as those described under the no-
31 action alternative. The types of beneficial impacts described under the no-action
32 alternative would be the same under alternative 3 but the scale would be greater, resulting
33 in increased beneficial impacts due to expanded vegetation management and native plant
34 habitat restoration. Impacts to the San Francisco lessingia resulting from NPS actions that
35 are part of alternative 3 would be long-term, beneficial, minor, and localized. The
36 determination of effect under Section 7 of the Endangered Species Act would be “*may*
37 *affect, not likely to adversely affect.*”

38 ***State Threatened and Endangered***

39 **Bank swallow (*Riparia riparia*).** Impacts to bank swallows and their habitat from
40 alternative 3 would be the same as the no-action alternative. Impacts would be long-term,
41 beneficial, minor, and localized.

42 **Montara Manzanita (*Arctostaphylos montaraensis*).** The Montara manzanita is
43 endemic to the slopes of Montara Mountain in San Mateo County. Most of the known

1 habitat is located in McNee Ranch State Park, outside of NPS-owned lands. Limited
 2 surveying of known populations and potential habitat outside of this area has been
 3 conducted.

4 Under alternative 3, the National Park Service would acquire lands in San Mateo County.
 5 In particular, the Ranch Corral de Tierra property, which is adjacent to McNee Ranch
 6 State Park, would be acquired. Impacts to the Montara manzanita could occur from
 7 visitor use and habitat restoration. Increased visitor use in San Mateo County, in
 8 particular at Ranch Corral de Tierra, which is adjacent McNee Ranch, could cause
 9 increased erosion and trampling of plants along trails in the Montara Mountain area—
 10 resulting in a long-term, minor to moderate, adverse, localized impact. Habitat restoration
 11 in this area could also improve conditions for this rare plant (a beneficial impact), but
 12 would not likely result in range expansion or an increase in individual plants due to the
 13 specific habitat requirements of the species. The National Park Service would monitor
 14 Montara Manzanita populations and survey potential habitat and would manage visitor
 15 use and construction activities within known habitat to avoid or minimize impacts to the
 16 species—these actions would result in beneficial impacts. Collectively, impacts to the
 17 Montara manzanita or its habitat from alternative 3 would be long-term, minor, adverse,
 18 and localized.

19 **Conclusion**

20 **Table 17: Potential Impacts to Special Status Species of Golden Gate National Recreation**
 21 **Area, Alternative 3**

Species	Status	ESA Determination
California red-legged frog (<i>Rana aurora draytonii</i>)	Federal threatened	"may affect, not likely to adversely affect"
Mission blue butterfly (<i>Icaricia icaroides missionensis</i>)	Federal endangered	"may affect, not likely to adversely affect"
Tidewater goby (<i>Eucyclogobius newberryi</i>)	Federal endangered	"may affect, not likely to adversely affect"
California brown pelican (<i>Pelecanus occidentalis californicus</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Francisco garter snake (<i>Thamnophis sirtalis tetrataenia</i>)	Federal endangered	"may affect, not likely to adversely affect"
San Bruno elfin butterfly (<i>Callophrys mossii bayensis</i>)	Federal endangered	"may affect, not likely to adversely affect"

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	"may affect, not likely to adversely affect"
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Federal threatened	"may affect, not likely to adversely affect."
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	"may affect, not likely to adversely affect"
San Francisco lessingia (<i>Lessingia germanorum</i>)	Federal endangered	"may affect, not likely to adversely affect"
Bank swallow (<i>Riparia riparia</i>)	Federal candidate; State threatened	long-term, beneficial, minor, and localized
Montara Manzanita (<i>Arctostaphylos montaraensis</i>)	State threatened	long-term, minor, adverse, and localized

1

2 No impairment of listed species would result from this alternative.

3

4 **CULTURAL RESOURCES**

5 *Note: DSC cultural resource specialist and park staff need additional discussions*
6 *regarding archeological resources and impacts from climate change among other impact*
7 *issues before finalizing impacts. The narrative is not parallel across the board, and the*
8 *assumption appears to be that lack of survey and knowledge is an adverse impact only in*
9 *the no-action alternative. Therefore, the archeological resources discussion for both*
10 *GOGA and MUWO will need additional work.*

11 **Archeological Resources**

12 **No Action Alternative**

13 *Analysis*

14 Currently, 10% of Golden Gate National Recreation Area has been surveyed for
15 prehistoric and historic archeological resources. To date, approximately 190
16 archeological sites have been inventoried, but the significance of those sites requires
17 further study and evaluation. Furthermore, comprehensive consultations with American

1 Indian tribes regarding archeological sites with ethnographic significance in the park will
2 continue into the future. As a result of this need for additional survey work and
3 consultation, archeological resources are subject to potential deterioration, lack of
4 adequate protection in some cases, and possible loss of integrity from natural processes,
5 ongoing agricultural and ranching operations, inadvertent visitor activity, and vandalism.

6 On Alcatraz Island, not much is known about any prehistoric and historic archeological
7 resources. A comprehensive professional baseline archeological survey of the island and
8 consultations with American Indian tribes regarding archeological sites with
9 ethnographic significance will continue to be needed. Park staff suspect that Alcatraz
10 Island has potential for buried prehistoric and historic deposits associated with
11 prehistoric, military, prison, and maritime commercial themes. On Alcatraz Island, just as
12 with the rest of Golden Gate National Recreation Area, there is need for additional survey
13 work and consultation; without this, archeological resources are subject to potential
14 deterioration, lack of adequate protection in some cases, and possible loss of integrity
15 from natural processes and human activities. The lack of survey and knowledge as
16 described above could have a long-term, minor to moderate, adverse impact on
17 archeological resources. **Need to discuss if the actions taken today and continue into the
18 future is really as adverse as described.**

19 ***Conclusion***

20 Little information is available concerning prehistoric and historic archeological resources
21 in Golden Gate National Recreation Area and on Alcatraz Island. A comprehensive
22 professional archeological survey has been conducted for only approximately 10% of the
23 park's acreage. Alcatraz Island has the potential for a wide range of buried prehistoric
24 and historic deposits associated with its prehistoric, military, prison, and maritime
25 commercial themes. The park staff continues to work in protecting and preserving known
26 archeological resources. The lack of survey and knowledge as described above could
27 result in a long-term, minor to moderate, adverse impact on archeological resources.

28 No impairment of archeological resources would result from this alternative.

29 Based upon the above analysis, under this alternative the Section 106 determination of
30 effect on archeological resources in Golden Gate National Recreation Area and on
31 Alcatraz Island would be *adverse effect*.

32 **Need to discuss if the actions taken today and continue into the future is really as adverse
33 as described.**

34 ***Alternative 1: Connecting People with the Parks***

35 ***Analysis***

36 Park staff would continue to work to protect archeological resources from unauthorized
37 removal or other destructive actions. Modification or relocation of existing trails, and
38 construction, development, or improvement of trails, roadways, pull-offs, picnic and
39 camping areas, overlooks, buildings, parking areas, visitor amenities, and interpretive
40 facilities could affect the integrity of some archeological resources, but every effort
41 would be undertaken to avoid known or discovered archeological sites. If such sites could
42 not be avoided, mitigative procedures would be undertaken in consultation with the
43 California state historic preservation office.

1 Additionally, it is estimated that a substantial number of the park's archeological sites
2 could be lost as a result of rising sea levels during the coming years. The National Park
3 Service recognizes that archeological resources help connect visitors with the park and its
4 values. Prehistoric archeological sites on park lands, which provide the last vestiges of
5 sites associated with indigenous peoples in the region, were among the first sites in the
6 park listed in the National Register of Historic Places. Mitigation is currently taking place
7 for historic archeological sites, but to a lesser degree for prehistoric sites. Historic
8 archeological resources may be impacted under this alternative, pursuant to consultation
9 and in compliance with mitigative measures approved by the California state historic
10 preservation office, whereas indigenous prehistoric sites under this alternative would be
11 preserved intact in consultation with American Indian tribes and organizations.

12 On Alcatraz Island, within the Diverse Opportunities Management, Evolved Cultural
13 Landscape, and Historic Immersion management zones, the archeological resources
14 would be identified and may be stabilized for incorporation into visitor interpretive
15 opportunities, thus enhancing their protection through increased awareness and
16 understanding. In the Natural and Sensitive management zones, which generally cover
17 the island's perimeter areas, archeological resources would be identified, evaluated, and
18 provided stabilization, security, or other protection commensurate with their significance
19 and sensitivity.

20 **Conclusion**

21 Archeological resources would continue to be protected from unauthorized removal or
22 other destructive actions. New or modified park facilities could affect the integrity of
23 some archeological resources, but every effort would be undertaken to avoid known or
24 discovered archeological sites. If such sites could not be avoided, mitigative procedures
25 would be undertaken in consultation with the California state historic preservation office.
26 Since park lands provide the last vestiges of sites associated with indigenous peoples, the
27 National Park Service would preserve indigenous sites intact in consultation with
28 American Indian groups and organizations. On Alcatraz Island, archeological resources
29 would be identified and may be stabilized for incorporation into visitor interpretive
30 opportunities within some management zones.

31 Under this alternative, the Section 106 determination of effect on archeological resources
32 in Golden Gate National Recreation Area and on Alcatraz Island would be *no adverse*
33 *effect*.

34 No impairment of the archeological resources would result from this alternative.

35

36 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

37 **Analysis**

38 Park staff would continue to work to protect archeological resources from unauthorized
39 removal or other destructive actions. Coastal ecosystem restoration and rehabilitation of
40 pastoral and rural landscapes could impact the integrity of some archeological resources.
41 Accordingly, this alternative would require a detailed archeological resource stabilization
42 and recovery plan to preserve the integrity of the park's archeological resources. As part
43 of all earth-disturbing activities, every effort would be undertaken to avoid known or

1 discovered archeological sites. If such sites could not be avoided, mitigative procedures
2 would be undertaken in consultation with the California state historic preservation office.
3 Additionally, prehistoric archeological sites, which represent the last vestiges of remnant
4 sites associated with indigenous peoples in the region, would be preserved intact in
5 consultation with American Indian tribes and organizations.

6 Archeological resources in the Natural and Sensitive Resources management zones,
7 which cover much of the park land in this alternative, would be identified, evaluated, and
8 provided stabilization, security, or other protection commensurate with their significance
9 and sensitivity, but would generally not be incorporated as visitor education opportunities
10 in the park's interpretive programs. Archeological resources in the Evolved Cultural
11 Landscape and Historic Immersion management zones would be identified and stabilized,
12 as part of cultural landscape enhancement and used as visitor education opportunities to
13 interpret human occupation of and interaction with the coastal environment.

14 In addition to the actions identified in the above analysis, managing archeological
15 resources on Alcatraz would require a detailed archeological resource stabilization and
16 recovery plan. As part of all earth-disturbing activities, every effort would be undertaken
17 to avoid known or discovered archeological sites. In the Evolved Cultural Landscape and
18 Historic Immersion management zones, which form the central historical core of the
19 island in this alternative, archeological resources would be identified and stabilized as
20 part of cultural landscape enhancement and visitor interpretive opportunities. In the
21 Natural and Sensitive Resources management zones, which cover much of the rest of the
22 island in this alternative, archeological resources would be identified, stabilized, or
23 provided protection commensurate with their significance and sensitivity.

24 **Conclusion**

25 Coastal ecosystem restoration and the rehabilitation of pastoral and rural landscapes
26 could affect the integrity of some archeological resources. When potential impacts are
27 identified, the National Park Service would pursue consultation and mitigation with the
28 California state historic preservation office. The National Park Service would preserve
29 indigenous prehistoric sites intact, in consultation with American Indian groups and
30 organizations.

31 On Alcatraz Island, some archeological sites or features could be lost due to erosion or
32 other natural processes; a minimum amount of stabilization would be afforded
33 archeological sites to ensure that the island's archeological resource integrity would be
34 retained and its National Historic Landmark designation would not be lost.

35 Under this alternative, the Section 106 determination of effect on archeological resources
36 in Golden Gate National Recreation Area and on Alcatraz Island would be *no adverse*
37 *effect*.

38 No impairment of the archeological resources would result from this alternative.
39
40

1 **Alternative 3: Focusing on National Treasures**

2 **Analysis**

3 Park staff would continue to work to protect archeological resources from unauthorized
4 removal or other destructive actions. Generally, archeological resources under this
5 alternative would be 1) stabilized for interpretation purposes or as part of cultural
6 landscape enhancement, or 2) incorporated into historic immersion opportunities and
7 stabilized and protected to allow public understanding without the threat of damage,
8 removal, or vandalism. Although modification or development of facilities, and the
9 rehabilitation or restoration of resources to immerse visitors in the compelling history and
10 stories of the park's cultural sites could affect the integrity of some archeological
11 resources, every effort would be undertaken to avoid disturbance of known or discovered
12 archeological sites. If such sites could not be avoided, mitigative procedures would be
13 undertaken in consultation with the California state historic preservation office.

14 On Alcatraz Island, alternative 3 is designed to enhance the contributing features of
15 Alcatraz Island National Historic Landmark. The analysis, cataloging, and proactive
16 recovery of archeological resources on Alcatraz Island would be given a high priority.
17 These activities would result in enhancement of the island's cultural resource research
18 and interpretive programs and would contribute to its emerging/growing museum
19 collections. Archeological resources in the Evolved Cultural Landscape and Historic
20 Immersion management zones, which cover the majority of the island in this alternative,
21 would be identified, protected, stabilized, rehabilitated, or restored. They then would be
22 incorporated into historic immersion and visitor education interpretive opportunities or
23 become a part of cultural landscape enhancement. Under this alternative, the preservation
24 and interpretation of key archeological resources, and access to such resources illustrating
25 the island's prehistoric and historic periods and themes, would be given high priority. As
26 part of all earth-disturbing activities, every effort would be undertaken to avoid known or
27 discovered archeological sites. If such sites could not be avoided, mitigative procedures
28 would be undertaken in consultation with the California state historic preservation office.

29 **Conclusion**

30 Archeological resources throughout the park would be stabilized for interpretation or for
31 incorporated in historic immersion opportunities. The majority of park lands on Alcatraz
32 Island are within management zones where archeological resources illustrating the
33 island's prehistoric and historic periods and themes would be given high priority.

34 Under this alternative, the Section 106 determination of effect on archeological resources
35 in Golden Gate National Recreation Area would be *no adverse effect*.

36 No impairment of the archeological resources would result from this alternative.

37

38 **Ethnographic Resources/Traditional Cultural Properties**

39 **No Action Alternative**

40 **Analysis**

41 Currently, there are no identified ethnographic resources or traditional cultural properties
42 within Golden Gate National Recreation Area or on Alcatraz Island. However, Alcatraz

1 Island was occupied by “Indians of All Tribes” from November 1969 to June 1971 as an
2 internationally publicized protest to focus attention on the plight of American Indians and
3 to assert the need for Indian unity and solidarity for achieving self-determination and
4 securing political rights. Thus, the occupation increased awareness of the American
5 Indian’s political, economic, and social concerns and provided the foundation for what
6 would become a political movement—the American Indian Movement—to promote
7 cultural pride and to secure and protect Indian rights. The occupation resulted in the
8 nation’s increased awareness of American Indian concerns and issues and the
9 establishment of D-Q University (a tribal community college that focuses on indigenous
10 peoples) at Davis, California, and other institutions throughout the nation. Tangible
11 evidence of the occupation on Alcatraz Island includes graffiti and physical alterations
12 attributed to the Indians’ activities. Since the occupation, the island has become a
13 symbolic focal point of American Indian pride and solidarity among relocated American
14 Indians in the San Francisco Bay Area, as well as in the nation at large. Thus, the
15 National Park Service, in recognition of the ethnographic significance of Alcatraz Island
16 for American Indians and the island’s potential for listing in the National Register of
17 Historic Places as a Traditional Cultural Property, is in consultation with American
18 Indians regarding the identification, preservation, and interpretation of the island’s
19 ethnographic resources. This action would have a long-term, negligible to minor,
20 beneficial impact to the resource.

21 ***Conclusion***

22 Currently, there are no identified ethnographic resources or traditional cultural properties
23 in Golden Gate National Recreation Area and on Alcatraz Island. However, the National
24 Park Service recognizes the ethnographic significance of Alcatraz Island for American
25 Indians as a result of the island’s occupation from 1969 to 1971 and thus its potential for
26 listing in the National Register of Historic Places as a traditional cultural property. This
27 action would have a long-term, negligible to minor, beneficial impact to the resource.

28 Under this alternative, the Section 106 determination of effect on ethnographic
29 resources/traditional cultural properties for Golden Gate National Recreation Area and
30 Alcatraz Island would be *no adverse effect*.

31 No impairment of ethnographic resources would result from this alternative.

32 ***Alternative 1: Connecting People with the Parks***

33 ***Analysis***

34 With the exception of Alcatraz Island, there are no identified or recognized potential
35 ethnographic resources or traditional cultural properties in Golden Gate National
36 Recreation Area. This alternative’s emphasis on connecting people with the park’s
37 resources and stories would build and expand upon the National Park Service’s ongoing
38 consultation efforts with American Indians for the identification, preservation, and
39 interpretation of ethnographic resources on Alcatraz Island. This action would have a
40 long-term, negligible, beneficial impact to the resource.

41 ***Conclusion***

42 With the exception of Alcatraz Island, there are no identified or recognized potential
43 ethnographic resources or traditional cultural properties in Golden Gate National

1 Recreation Area. Identification, preservation, and interpretation of ethnographic
2 resources on Alcatraz Island would be enhanced as a result of expanding National Park
3 Service consultations with American Indians. This action would have a long-term,
4 negligible, beneficial impact to the resource.

5 Under this alternative, the Section 106 determination of effect on ethnographic resources
6 and traditional cultural properties in Golden Gate National Recreation Area and Alcatraz
7 Island would be *no adverse effect*.

8 No impairment of ethnographic resources would result from this alternative.

9 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

10 **Analysis**

11 With the exception of Alcatraz Island, there are no identified or recognized potential
12 ethnographic resources or traditional cultural properties in Golden Gate National
13 Recreation Area.

14 On Alcatraz Island, some archeological sites and features with ethnographic significance
15 and some resources having associations with the occupation of 1969-1971 could be lost
16 due to erosion or other natural processes such as weathering under this alternative. A
17 minimum amount of stabilization would be afforded ethnographic resources so that the
18 island's integrity as a potential traditional cultural property would not be compromised.
19 Additionally, this alternative's emphasis on providing visitors with opportunities to
20 engage in Alcatraz Island's isolation, natural resources, and layers of history via
21 ecotourism, outdoor learning, and natural and cultural resource stewardship programming
22 would build and expand upon the National Park Service's ongoing consultation efforts
23 with American Indians for the identification, preservation, and interpretation of
24 ethnographic resources on Alcatraz Island. This action would have a long-term,
25 negligible, beneficial impact to the resource.

26 **Conclusion**

27 With the exception of Alcatraz Island, there are no identified or recognized potential
28 ethnographic resources or traditional cultural properties in Golden Gate National
29 Recreation Area. Ethnographic significance and some resources having associations with
30 the occupation of 1969-1971 could be lost due to erosion or other natural processes such
31 as weathering under this alternative; a minimum amount of stabilization would be
32 afforded ethnographic resources so that the island's integrity as a potential traditional
33 cultural property would not be compromised. This action would have a long-term,
34 negligible, beneficial impact to the resource.

35 Under this alternative, the Section 106 determination of effect on ethnographic
36 resources/traditional cultural properties in Golden Gate National Recreation Area and
37 Alcatraz Island would be *no adverse effect*.

38 No impairment of ethnographic resources would result from this alternative.

39

1 **Alternative 3: Focusing on National Treasures**

2 **Analysis**

3 With the exception of Alcatraz Island, there are no identified or recognized potential
4 ethnographic resources or traditional cultural properties in Golden Gate National
5 Recreation Area.

6 Under this alternative, which is designed to enhance the contributing features of Alcatraz
7 Island National Historic Landmark, analysis and cataloging of ethnographic resources on
8 Alcatraz Island in consultation with American Indian tribes and groups would be given a
9 high priority, thereby enhancing the island's cultural resource research and interpretive
10 programs and contributing to its emerging and growing museum collections. The island's
11 potential for listing as a traditional cultural property in the National Register of Historic
12 Places would also be evaluated and studied in consultation with American Indian tribes
13 and groups. This action would have a long-term, negligible, beneficial impact to the
14 resource.

15 Ethnographic resources in the Evolved Cultural Landscape and Historic Immersion
16 management zones, which cover the majority of the island in this alternative, would be
17 identified, protected, stabilized, rehabilitated, or restored. They would be incorporated
18 into historic immersion/visitor education interpretive opportunities or become part of
19 cultural landscape enhancement. Under this alternative, preservation and interpretation
20 of, as well as public access to, key ethnographic resources illustrating the island's
21 prehistoric and historic periods and themes would be given high priority. This action
22 would have a long-term, negligible, beneficial impact to the resource.

23 **Conclusion**

24 With the exception of Alcatraz Island, there are no identified or recognized potential
25 ethnographic resources or traditional cultural properties in Golden Gate National
26 Recreation Area. On Alcatraz Island, analysis and cataloging of ethnographic resources
27 and the evaluation of the island's potential for listing in the National Register of Historic
28 Places as a traditional cultural property in consultation with American Indian tribes and
29 groups would be given higher priority than other areas of Golden Gate National
30 Recreation Area. These actions would enhance the island's cultural resource research and
31 interpretive programs and contribute to its emerging and growing museum collections.
32 This action would have a long-term, negligible, beneficial impact to the resource.

33 Under this alternative, the Section 106 determination of effect on ethnographic
34 resources/traditional cultural properties in Golden Gate National Recreation Area and
35 Alcatraz Island would be *no adverse effect*.

36 No impairment of ethnographic resources would result from this alternative.

37

38

1 **Historic Buildings**

2 ***No Action Alternative***

3 ***Analysis***

4 Extensive studies have been conducted and are underway in Golden Gate National
5 Recreation Area to identify and evaluate historic buildings for listing in the National
6 Register of Historic Places and designation as National Historic Landmarks. The park's
7 cultural resources include more than 700 historic buildings, and the park contains the
8 nation's largest collection of military installations and fortifications dating from 1776
9 through the Cold War.

10 The park staff works to protect and preserve historic buildings as financial resources and
11 opportunities become available. The National Park Service and park partners adaptively
12 use many historic buildings for various public and private purposes, including
13 administration and operations; staff housing; offices; commercial ventures; historic
14 residence leasing programs; recreation, educational, and interpretive programs; and
15 ongoing agricultural and ranching activities. The incremental approach to the
16 preservation of historic buildings has resulted in varying degrees of preservation and the
17 possible localized loss of some historic fabric and integrity, but overall the park's historic
18 buildings have retained their integrity. As the park's information database increases for
19 historic buildings, the significance and preservation treatment of some buildings may also
20 increase, resulting in a long-term, negligible to minor, beneficial impact.

21 All historic buildings on Alcatraz Island are contributing resources to the Alcatraz Island
22 National Historic Landmark. The park staff works to protect and preserve historic
23 buildings as financial resources and opportunities become available. Located in San
24 Francisco Bay, the historic structures on Alcatraz Island are constantly assaulted by the
25 marine environment and weather. The structures are numerous, large, and very difficult
26 to maintain, given the amount of financial resources required to maintain their historic
27 integrity. The weather and lack of significant capital investment dollars has resulted in
28 varying degrees of preservation of some key historic buildings, as well as varying degrees
29 of deterioration and loss of historic fabric in others. Building 64 (historic barracks) has
30 been partially rehabilitated and is adaptively used for administrative purposes and some
31 visitor services. Parts of the building, including the upper floors, have not been
32 rehabilitated and remain unused. The Main Prison Building and several adjacent areas,
33 such as the Recreation Yard, have been rehabilitated and are managed as part of the
34 central visitor experience. Portions of the Main Prison Building are closed. Adjacent
35 buildings, such as the Laundry and Model Industries buildings, have suffered severe
36 deterioration and loss of historic fabric. The Lighthouse has been afforded minimal
37 preservation and is managed to serve its historic function. The Power Plant and
38 Quartermaster Warehouse have been afforded minimal preservation and are currently
39 used for park operations and maintenance. Overall, the impacts to historic buildings on
40 Alcatraz Island are long-term, minor to moderate, and adverse.

41 ***Conclusion***

42 The National Park Service and park partners adaptively use many historic buildings for
43 various public and private purposes. The park staff works to protect and preserve historic
44 buildings as financial resources and opportunities become available. The current

1 management approach has resulted in varying degrees of preservation and the potential
2 for localized loss of some historic fabric and integrity, but overall the park's historic
3 buildings have retained their historic integrity resulting in a long-term, negligible to
4 minor, beneficial impact.

5 On Alcatraz Island, all the historic buildings are contributing resources to the Alcatraz
6 Island National Historic Landmark. The marine environment, weather, and lack of
7 significant capital investment dollars has resulted in varying degrees of preservation of
8 some key historic buildings, as well as varying degrees of deterioration and loss of
9 historic fabric in others. Impacts to historic buildings on Alcatraz Island are long-term,
10 minor to moderate, and adverse.

11 Under this alternative, the Section 106 determination of effect on historic buildings in
12 Golden Gate National Recreation Area would be *no adverse effect*. On Alcatraz Island,
13 the Section 106 determination of effect on historic buildings would be *adverse effect*.

14 No impairment of historic buildings would result from this alternative.

15 ***Alternative 1: Connecting People with the Parks***

16 ***Analysis***

17 When compared with the no-action alternative, actions under alternative 1 would
18 generally provide better opportunities for strengthening the integrity and adaptive use of
19 historic buildings that contribute to properties listed in the National Register of Historic
20 Places or designated as National Historic Landmarks. Although actions under this
21 alternative, such as adaptive reuse of historic structures, could result in localized loss of
22 some historic fabric on a few historic buildings, overall this alternative would improve
23 the integrity and enhance the preservation of the park's historic buildings resulting in a
24 long-term, negligible to minor, beneficial impact.

25 Historic buildings associated with the Hill 640 Military Reservation coastal defense
26 fortifications overlooking the Pacific Ocean and the southern end of Stinson Beach would
27 be stabilized and preserved. Historic buildings at the Rapozo Ranch (Miwok Stables) and
28 Golden Gate Dairy in the Tennessee Valley would be preserved through rehabilitation
29 and adaptively used. Historic buildings at Forts Barry and Cronkhite in the Marin
30 Headlands would be preserved through rehabilitation and continue to be adaptively used
31 by the park and park partners for recreational, educational, and stewardship activities.
32 Historic buildings associated with the nearby Nike Missile Site would be rehabilitated or
33 restored to their period of significance for interpretive purposes. Based on their condition,
34 significance, and suitability for recreational, educational, or operational purposes, historic
35 buildings associated with historic coastal fortifications in the Marin Headlands would be
36 rehabilitated, stabilized, allowed to deteriorate naturally, or removed if they become
37 unsafe. Historic buildings associated with coastal defense fortifications in the Kirby Cove
38 area would be preserved through rehabilitation and interpreted. The Point Bonita
39 Lighthouse would be preserved through rehabilitation for interpretation of the site's
40 association with maritime commercial and military history. Historic buildings in Upper
41 Fort Mason (Fort Mason Historic District) would be preserved through rehabilitation and
42 adaptive use to serve as a portal to the park and to provide for uses such as a hostel or
43 other overnight accommodations, park headquarters, and park/partner offices and

1 programs. Historic buildings at Fort Miley would be preserved through rehabilitation, and
2 the Marine Exchange Lookout Station (Octagon House) would be rehabilitated and used
3 for interpretation. Historic buildings associated with Battery Davis at Fort Funston would
4 be rehabilitated and interpreted. Other extant buildings at Fort Funston would be retained
5 and could be expanded to meet park operational needs. Historic buildings associated with
6 historic coastal defense fortifications on Milagra Ridge, Sweeney Ridge, and other
7 locations in San Mateo County would be afforded preservation treatment. As the park's
8 information increases regarding historic buildings in the San Mateo County area, the
9 significance and preservation treatment of some buildings may also evolve. Historic
10 agriculture-related buildings at Rancho Corral de Tierra would be stabilized if determined
11 eligible for listing in the National Register of Historic Places. The Montara Lighthouse
12 and associated historic buildings, which include the historic fog signal structure and
13 Victorian light keeper's residence, would be preserved through rehabilitation and
14 adaptively used to interpret their association with maritime commercial history as an aid
15 to navigation. All these actions would result in long-term, negligible, beneficial impacts.

16 All historic buildings on Alcatraz Island are contributing resources to the Alcatraz Island
17 National Historic Landmark. Actions under this alternative would result in islandwide
18 improvement in the condition of historic buildings. Although this alternative would result
19 in some localized deterioration or loss of historic fabric on some historic buildings, all
20 primary buildings would be rehabilitated, and improvements in conditions of most
21 historic buildings would generally range between "fair" and "good."

22 Building 64 and the Laundry Building would be fully rehabilitated and adaptively used as
23 multi-purpose facilities to host an expanded variety of visitor services. The hospital wing
24 of the Main Prison Building would be rehabilitated and adaptively used for visitor
25 activities. The Guard House would be rehabilitated, and the Officer's Club and Warden's
26 House would be stabilized as ruins. The Power Plant and Quartermaster Warehouse, as
27 well as a portion of the Model Industries Building, would be rehabilitated and adaptively
28 used for maintenance, storage, public safety, and to showcase alternative energy
29 technology. Other historic buildings would be stabilized, rehabilitated, allowed to
30 deteriorate naturally, or be removed, depending on their condition and integrity,
31 interpretive value, and suitability for adaptive use. Actions associated with historic
32 buildings on Alcatraz Island would have a negligible to minor, beneficial impacts.

33 ***Conclusion***

34 Implementing the actions under alternative 1 would generally provide better opportunities
35 for strengthening the integrity and adaptive use of historic buildings that contribute to
36 properties listed in the National Register of Historic Places or are designated as National
37 Historic Landmarks. Actions under this alternative, such as adaptive reuse of historic
38 structures, could result in localized loss of historic fabric on some historic buildings but
39 would generally improve the integrity and enhance the preservation of the park's historic
40 buildings, resulting in long-term, negligible to minor, beneficial impacts.

41 All historic buildings on Alcatraz Island are contributing resources to the Alcatraz Island
42 National Historic Landmark. Under alternative 1, park resources on Alcatraz Island
43 would result in islandwide improvement in the condition of historic buildings. Although
44 this alternative would result in some localized deterioration or loss of historic buildings,
45 all primary buildings would be rehabilitated, and improvements in conditions of most

1 historic buildings would generally range between “fair” and “good,” resulting in a
2 negligible to minor, beneficial impact.

3 Under this alternative, the Section 106 determination of effect on historic buildings in
4 Golden Gate National Recreation Area and on Alcatraz Island would be *no adverse*
5 *effect*.

6 No impairment of historic buildings would result from this alternative.

7 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

8 **Analysis**

9 Actions under alternative 2 would generally provide for some opportunities for
10 strengthening the integrity and adaptive use of historic buildings that contribute to
11 properties listed in the National Register of Historic Places or designated as National
12 Historic Landmarks. To accomplish this, more historic buildings would be stabilized, but
13 not as many would be rehabilitated, interpreted, and adaptively used. Actions that would
14 help to achieve the primary goals of coastal ecosystem restoration and rehabilitation of
15 pastoral and rural landscapes could impact the integrity of some historic buildings. This
16 alternative would require a detailed historic building stabilization and recovery plan that
17 would provide for the stabilization guidance of a significant number of historic buildings.
18 Although actions under this alternative could result in localized loss of historic fabric on
19 some historic buildings and a few historic buildings could be lost, overall this alternative
20 would improve the integrity and enhance the preservation of the park’s historic buildings
21 resulting in impacts that are long-term, and range from negligible and beneficial to
22 moderate and adverse.

23 Historic buildings in the Natural and Sensitive Resources management zones, which
24 cover much of the park land in this alternative, would be identified, stabilized, allowed to
25 deteriorate naturally, or be removed if they become unsafe. Historic buildings in the
26 Evolved Cultural Landscape and Historic Immersion management zones would undergo
27 preservation treatments ranging from stabilization to restoration to their period of
28 significance, based on their condition and interpretive value; this would result in impacts
29 that are long-term and range from negligible and beneficial to moderate and adverse.

30 Historic buildings associated with the Hill 640 Military Reservation coastal defense
31 fortifications overlooking the Pacific Ocean and the southern end of Stinson Beach would
32 be stabilized and preserved. Historic buildings at the Rapozo Ranch (Miwok Stables) and
33 Golden Gate Dairy in the Tennessee Valley would be preserved through rehabilitation
34 and would be adaptively used. Historic buildings at Forts Barry and Cronkhite in the
35 Marin Headlands would be preserved through rehabilitation and would continue to be
36 adaptively used by the park and park partners for recreational, educational, and
37 stewardship activities. Historic buildings associated with the nearby Nike Missile Site
38 would be rehabilitated or restored to their period of significance for interpretive purposes.
39 Based on their condition and suitability for recreational, visitor use, or educational or
40 operational purposes, historic buildings associated with historic coastal fortifications in
41 the Marin Headlands would be rehabilitated and stabilized, resulting in long-term,
42 negligible, beneficial impacts.

1 Historic buildings associated with coastal defense fortifications in the Kirby Cove area
2 would be preserved through rehabilitation and interpreted. Historic buildings associated
3 with the Montara Lighthouse, which constitute the only complete lighthouse facility in
4 the park, would be preserved through rehabilitation, and adaptively used for stewardship
5 and environmental education, while the historic buildings associated with the Point
6 Bonita Lighthouse would be preserved through rehabilitation for interpretation of the
7 site's association with maritime commercial and military history. Historic buildings in
8 Upper Fort Mason (Fort Mason Historic District) would be preserved through
9 rehabilitation and would be adaptively used to serve as a portal to the park and provide
10 for uses such as a hostel and other overnight accommodations, park headquarters, and
11 park and park partner offices and programs. Historic buildings in the Fort Miley area
12 would be preserved through rehabilitation and adaptively used. The Marine Exchange
13 Lookout Station (Octagon House) would be rehabilitated and adaptively used to engage
14 the public in the natural and human history of the coastal marine environment. Historic
15 buildings associated with Battery Davis at Fort Funston would be stabilized. Other extant
16 buildings at Fort Funston would be retained and used to support park operations,
17 stewardship, and education activities. Historic buildings associated with coastal defense
18 fortifications on Milagra Ridge, Sweeney Ridge, and other locations in San Mateo
19 County would receive preservation treatment. As the park's information and
20 understanding of historic buildings in the San Mateo County area increases, the
21 significance and preservation treatment of some buildings may also evolve. Historic
22 agriculture-related buildings at Rancho Corral de Tierra would be stabilized if determined
23 eligible for listing in the National Register of Historic Places. These actions would result
24 in long-term, negligible, and beneficial.

25 Under alternative 2, more historic buildings on Alcatraz Island would become managed
26 ruins. However, a benchmark/threshold evaluation stabilization plan is needed to
27 determine the minimum level of historic building or fabric integrity needed in order to
28 retain the island's National Historic Landmark designation. Many of the island's historic
29 buildings would only be stabilized, while some buildings could be lost overtime.
30 However, the Main Prison Building would receive preservation treatment and Building
31 64 would be rehabilitated and adaptively used to support science, education, and
32 stewardship programs and administrative functions. The Guard House and other historic
33 buildings between the entry pier and the Main Prison Building would receive
34 preservation treatment to interpret their layers of history. The Main Prison Building,
35 including the hospital wing, would be rehabilitated or restored. The Laundry and Model
36 Industries buildings and the Officer's Club would be stabilized as ruins. Other historic
37 buildings would be stabilized, rehabilitated, allowed to deteriorate naturally after Historic
38 American Building Survey recordation, or removed depending on their
39 condition/integrity, interpretive value, and suitability for adaptive use. These actions
40 would result in long-term impacts, ranging from negligible and beneficial to moderate
41 and adverse.

42 **Conclusion**

43 When compared with the no-action alternative, actions under alternative 2 would
44 generally provide for some opportunities for strengthening the integrity and adaptive use
45 of historic buildings that contribute to properties listed in the National Register of
46 Historic Places or designated National Historic Landmarks. To accomplish this, more

1 historic buildings would be stabilized, but not as many would be rehabilitated,
2 interpreted, and adaptively used. The primary goals for coastal ecosystem restoration and
3 rehabilitation of pastoral and rural landscapes could impact the integrity of some historic
4 buildings. This alternative would require a detailed historic building stabilization and
5 recovery plan that would provide for the stabilization guidance of a significant number of
6 historic buildings. Although actions under this alternative could result in localized loss of
7 historic fabric of some historic buildings, and a few historic buildings could be lost,
8 overall this alternative would improve the integrity and enhance the preservation of the
9 park's historic buildings that contribute to properties listed in the National Register of
10 Historic Places or are designated National Historic Landmarks. These actions would
11 result in long-term impacts, ranging from negligible and beneficial to moderate and
12 adverse.

13 Under alternative 2, more historic buildings on Alcatraz Island would become managed
14 ruins. However, a benchmark/threshold evaluation stabilization plan is needed to
15 determine the minimum level of historic building/fabric integrity needed in order to retain
16 the island's National Historic Landmark designation. These actions would result in long-
17 term impacts, ranging from negligible and beneficial to moderate and adverse.

18 Under this alternative, the Section 106 determination of effect on historic buildings in
19 Golden Gate National Recreation Area would be *no adverse effect* and for historic
20 buildings on Alcatraz Island, the determination would be *adverse effect*.

21 No impairment of historic buildings would result from this alternative.

22 ***Alternative 3: Focusing on National Treasures***

23 ***Analysis***

24 Under alternative 3, nationally significant buildings would be rehabilitated and adaptively
25 used to showcase the park's military, maritime commercial, and agricultural/ranching
26 history and to support visitor programming and services. The condition of all primary
27 buildings would be improved, and this alternative would provide for the greatest number
28 of historic buildings preserved in "good" condition. This alternative would also provide
29 for public accessibility to the greatest number of historic buildings reflecting all eras and
30 themes of the park's history. Although actions under this alternative could result in some
31 localized adverse effects on historic buildings or components and features of some of the
32 buildings in order to enhance visitor access to and understanding of the park's resources,
33 overall this alternative would generally have comprehensive long-term, negligible,
34 beneficial impacts on the park's historic buildings.

35 This alternative would require extensive stabilization, rehabilitation, and restoration of
36 historic buildings, and it would create opportunities for creative interpretive programs,
37 visitor services, and development of cultural resource stewardship programs.

38 Historic buildings associated with Hill 640 Military Reservation coastal defense
39 fortifications overlooking the Pacific Ocean above Highway 1 and the southern end of
40 Stinson Beach would be stabilized and preserved. Historic buildings associated with the
41 Golden Gate Dairy in the Tennessee Valley would be preserved, rehabilitated, and
42 adaptively used. Depending on their condition and suitability for use as recreational,
43 educational, or operational facilities, historic buildings associated with the Repozo Ranch

1 (Miwok Stables) would be rehabilitated, stabilized, allowed to deteriorate naturally, or be
2 removed if they become unsafe. Historic buildings associated with Forts Barry and
3 Cronkhite and the nearby Nike Missile Site would be rehabilitated, interpreted, and
4 adaptively used. Historic buildings associated with the coastal fortifications in the Marin
5 Headlands, as well as the Kirby Cove area, would be rehabilitated and interpreted.
6 Historic buildings associated with the Montara Lighthouse, the park's only complete
7 intact lighthouse facility, would be rehabilitated or restored and adaptively used for
8 interpretation and visitor accommodations. Historic buildings associated with the Point
9 Bonita Lighthouse would be preserved through rehabilitation for interpretation. Historic
10 buildings in Upper Fort Mason (Fort Mason Historic District) would be preserved
11 through rehabilitation for interpretation of the installation's military and civilian history
12 and adaptive use for visitor services and expanded overnight accommodations. Compared
13 with the no-action alternative, alternative 3 would result in more Fort Mason historic
14 buildings dedicated to serve visitors, thus enhancing the visitor experience. Building 201
15 would be rehabilitated and adaptively used as the park's headquarters and a museum to
16 showcase the military history of Fort Mason and the 20th century San Francisco Port of
17 Embarkation, a National Historic Landmark that serves as the centerpiece of the Fort
18 Mason Historic District. Historic buildings, including those at West Fort Miley, the *USS*
19 *San Francisco* Memorial, and the Marine Exchange Lookout Station (Octagon House),
20 would be preserved through rehabilitation to showcase the area's military and maritime
21 history. Historic buildings at East Fort Miley would be preserved and adaptively used for
22 park maintenance and public safety operations. Historic buildings associated with Battery
23 Davis at Fort Funston would be preserved within the context of restoring the area's
24 natural setting. Nonhistoric buildings at the fort would be removed. Historic buildings
25 associated with coastal defense fortifications on Milagra Ridge, Sweeney Ridge, and
26 other locations in San Mateo County would be afforded preservation treatment. As the
27 park's information database increases for historic buildings in the San Mateo County
28 area, the significance and preservation treatment of some buildings may also increase.
29 Historic buildings associated with Rancho Corral de Tierra would be stabilized if
30 determined eligible for listing in the National Register of Historic Places. The Montara
31 Lighthouse and associated historic buildings, which include the historic fog signal
32 structure and Victorian light keeper's residence would be preserved through rehabilitation
33 and used for immersing the visitor into the historic scene and operations with maritime
34 commercial history and aid to navigation. The above actions would have long-term,
35 negligible and beneficial impacts on the park's historic buildings.

36 Alternative 3 is designed to enhance the contributing features of Alcatraz Island National
37 Historic Landmark by providing for an islandwide improvement in the condition of
38 historic buildings. This alternative, which includes the largest Historic Immersion
39 Management Zone of the four alternatives considered, would provide for the greatest
40 number of historic buildings preserved in "good" condition and for public accessibility to
41 the greatest number of historic buildings reflecting all eras of the island's history.
42 Although actions under this alternative could result in some localized adverse effects on
43 Alcatraz Island National Historic Landmark's individual historic buildings or
44 components and features of some of the buildings in order to enhance interpretation and
45 visitor access to and understanding of the island's resources, overall this alternative
46 would generally have comprehensive beneficial impacts on the landmark's historic

1 buildings. These actions would have long-term, negligible and beneficial impacts on the
2 park's historic buildings.

3 This alternative would require extensive stabilization, rehabilitation, and restoration of
4 historic buildings, and it would provide for increased opportunities for creative
5 interpretive programs, visitor services, and development of cultural resource stewardship
6 programs. Selected portions of Building 64 would be restored to tell the story of its
7 history and use. Areas of the building in which period restoration would be undertaken
8 include the post office, canteen, and a prison-era guard apartment. A significant portion
9 of the building would be stabilized to preserve its integrity. Other areas of the building
10 would be rehabilitated for visitor services and administrative functions, including modest
11 overnight accommodations for participants in education, conservation, and stewardship
12 programs.

13 The Main Prison Building (which includes the main cellblock, hospital wing,
14 administration wing, and basement citadel) and adjacent areas, including the Laundry
15 Building and Officer's Club, would provide visitors with the opportunities to explore the
16 federal penitentiary's history.

17 Under this alternative, visitors would also have access to the widest range of historic
18 buildings in historically accurate condition that tell stories about the different layers of
19 island history. Treatments ranging from upgrades to exhibits and furnishings, to more
20 complete restoration would continue with the goal of increasing access to and
21 interpretation of the Main Prison Building's history. In this alternative, the park would
22 manage most of the historic buildings in adjacent areas, such as the Warden's House that
23 would be stabilized as a ruin, to reinforce the sense of history as visitors move around the
24 island. The Officer's Club would be stabilized as a ruin while providing visitors with
25 opportunities to explore its historic components. Additional preservation would be
26 possible with the involvement of partners to make a more complete visitor experience
27 and interpret the building's lengthy history. The Laundry Building would be rehabilitated
28 as a multi-purpose facility, including flexible space that could accommodate and support
29 interpretation, special events, classrooms, and meetings. The discovery trail would
30 connect through the Laundry Building and provide bird viewing opportunities from the
31 building's interior. The Lighthouse and surrounding area would be preserved to provide
32 visitors with opportunities to learn about the maritime commercial history associated with
33 Alcatraz Island and its strategic location in San Francisco Bay. The Model Industries
34 Building would be stabilized as a ruin. To prevent disruption of nearby sensitive natural
35 resources, the building, its courtyard, and associated lower cliff area would be closed to
36 visitation and other uses. The Quartermaster Warehouse would be rehabilitated and used
37 for maintenance, storage, and public safety functions. Along with the Power Plant, it
38 could house green sustainable infrastructure technologies. The perimeter of the island,
39 including the coastal cliffs, would be managed to support interpretation of the island's
40 cultural and natural history and to provide greater access for visitors. Historic buildings
41 along the island's perimeter would be stabilized, rehabilitated, allowed to deteriorate
42 naturally, or removed depending on their condition/integrity, interpretive value, and
43 suitability for adaptive use. The above actions would have long-term, negligible and
44 beneficial impacts on the park's historic buildings.

45

1 **Conclusion**

2 Under alternative 3, nationally significant buildings would be rehabilitated and adaptively
3 used to showcase the park's military, maritime commercial, and agricultural/ranching
4 history themes and support visitor programming and services. The condition of all
5 primary buildings would be improved, and this alternative would provide for the greatest
6 number of historic buildings preserved in "good" condition. It would also provide for
7 public access to the greatest number of historic buildings. Although, actions under this
8 alternative could result in some localized adverse effects in order to enhance visitor
9 access to and understanding of the park's resources, overall this alternative would
10 generally have comprehensive beneficial impacts on the park's historic buildings. These
11 actions would have long-term, negligible and beneficial impacts on the park's historic
12 buildings.

13 This alternative is designed to significantly enhance the contributing features to the
14 Alcatraz Island National Historic Landmark. Additionally, the actions in this alternative
15 provides visitor access to the widest range of historic buildings in historically accurate
16 condition that tell stories about the different layers of history on Alcatraz Island. The
17 condition of all primary buildings would be improved, and this alternative, which
18 includes the largest Historic Immersion Zone of the four alternatives considered, would
19 provide for the greatest number of historic buildings preserved in "good" condition.
20 Although actions under this alternative could result in some localized adverse effects on
21 Alcatraz Island National Historic Landmark's individual historic buildings or
22 components and features of some of the buildings in order to enhance interpretation and
23 visitor access to and understanding of the island's resources, overall this alternative
24 would have beneficial impacts on the landmark's historic buildings. The above actions
25 would have long-term, negligible and beneficial impacts on the park's historic buildings.

26 Under this alternative, the Section 106 determination of effect on historic buildings in
27 Golden Gate National Recreation Area and on Alcatraz Island would be *no adverse*
28 *effect*.

29 No impairment of historic buildings would result from this alternative.

30

31 **Cultural Landscape Resources**

32 **No Action Alternative**

33 **Analysis**

34 Numerous cultural landscapes have been identified in Golden Gate National Recreation
35 Area, but not all have been inventoried and evaluated. Cultural landscapes in the park
36 include those associated with military installations and fortifications, lighthouses and
37 maritime commerce, and agricultural and ranching themes. Cultural landscape
38 preservation treatment is conducted as opportunities arise. The incremental approach to
39 preservation of cultural landscape resources has resulted in varying degrees of
40 preservation and possible localized loss of resource integrity, but overall the park's
41 cultural landscape resources have retained their historic integrity.

1 The park staff is working to preserve cultural landscapes that have integrity and they
2 continue to learn about cultural landscape resources. For instance, although the
3 significance of the cultural landscape values in the immediate area of the Phleger Estate
4 and other locations in San Mateo County has not been evaluated or determined, as the
5 National Park Service information database evolves for these areas such landscape
6 resource values will be preserved as part of the rural agricultural or natural landscape.
7 The above actions would have a long-term, negligible and beneficial impact.

8 Alcatraz Island National Historical Landmark, which includes the entire island, presents a
9 largely intact cultural landscape comprising a wide range of archeological and historic
10 resources, structures, and features associated with its historical use as a Civil War fort,
11 military prison, lighthouse operation for maritime commerce, federal penitentiary, and
12 the Indian Occupation of 1969-71. Currently, cultural landscape resource preservation
13 activities are conducted as opportunities arise. This incremental approach to preservation
14 has resulted in varying degrees of preservation of some key cultural landscape resources
15 and features as well as the deterioration or loss of others. For instance, the overall cultural
16 landscape adjacent to the Main Prison Building has been minimally preserved, although
17 localized adverse effects have resulted because of its use as seasonal and year-round
18 habitat for sea birds. The impacts on Alcatraz Island would range from long-term,
19 negligible and beneficial to moderate and adverse.

20 ***Conclusion***

21 Numerous cultural landscapes have been identified in Golden Gate National Recreation
22 Area, but not all have been inventoried and evaluated. Cultural landscape preservation
23 treatment is conducted as opportunities arise. This incremental approach to preservation
24 of cultural landscape resources has resulted in possible localized loss of resource
25 integrity, but overall the park's known cultural landscape resources have retained their
26 historic integrity. These actions would have a long-term, negligible and beneficial impact.

27 The cultural landscape resource preservation activities for the Alcatraz Island National
28 Historical Landmark are incrementally implemented as opportunities arise and therefore
29 result in varying degrees of preservation of some key cultural landscape resources and
30 features as well as the deterioration or loss of others. The impacts on Alcatraz Island
31 would range from long-term, negligible and beneficial to moderate and adverse.

32 Under this alternative, the Section 106 determination of effect on cultural landscape
33 resources in Golden Gate National Recreation Area would be *no adverse effect* and for
34 cultural landscape resources on Alcatraz Island, the determination would be *adverse*
35 *effect*.

36 No impairment of cultural landscape resources would result from this alternative.

37 ***Alternative 1: Connecting People with the Parks***

38 ***Analysis***

39 When compared with those of the no-action alternative, actions under alternative 1 would
40 provide better opportunities for strengthening and enhancing the integrity of cultural
41 landscape features that contribute to properties listed in the National Register of Historic
42 Places or designated National Historic Landmarks. Although actions under this
43 alternative could result in localized loss of some cultural landscape features, overall this

1 alternative would improve the integrity and enhance the preservation of the park's
2 cultural landscape resources. Cultural landscape resources would be managed primarily
3 to perpetuate their historic values, one component of which is scenery. These actions
4 would have a long-term, negligible and beneficial impact.

5 Under this alternative, significant cultural landscape resources associated with the
6 historic coastal defense fortifications at the Hill 640 Military Reservation as well and at
7 Milagra Ridge, Sweeney Ridge, and other locations in San Mateo County that can be
8 preserved without compromising natural resource values would be afforded preservation
9 treatment. As the park staff learns more about the cultural landscape resources in and
10 near the Phleger Estate and other locations in the San Mateo County area, the
11 significance and preservation treatment of some landscape features may also increase.
12 These actions would have a long-term, negligible and beneficial impact.

13 Cultural landscape resources associated with the Rapozo Ranch (Miwok Stables), Golden
14 Gate Dairy, and Miwok Trail in the Tennessee Valley would be preserved. Significant
15 cultural landscape resources associated with the rural agricultural landscape at Rancho
16 Corral de Tierra in San Mateo County that can be preserved without compromising
17 natural resource values would be afforded preservation treatment if determined eligible
18 for listing in the National Register of Historic Places. These actions would have a long-
19 term, negligible and beneficial impact.

20 Significant cultural landscape resources at Forts Barry, Cronkhite, and Miley, Kirby
21 Cove, and the nearby Nike Missile Site in the Marin Headlands would be preserved
22 through rehabilitation and would be managed to perpetuate their historic values. They
23 would continue to be used by the park and park partners for recreational, educational,
24 interpretive, and stewardship programs and activities and to provide visitors with an
25 expanded menu of opportunities that are strongly linked to the park purpose. Elements of
26 such landscapes could be adapted to accommodate visitor use and education purposes or
27 park administrative purposes resulting in long-term, negligible and beneficial impact.

28 Cultural landscape resources associated with the Montara Lighthouse, the only complete
29 lighthouse facility in the park, would be preserved through rehabilitation and used for
30 interpreting its association with maritime commerce as an aid to navigation. Cultural
31 landscape resources associated with the Point Bonita Lighthouse would be preserved
32 through rehabilitation for interpretation of the site's association with maritime
33 commercial and military history.

34 Cultural landscape resources in Upper Fort Mason (Fort Mason Historic District) would
35 be preserved through rehabilitation and restoration and would be interpreted. Significant
36 cultural landscape resources associated with Battery Davis at Fort Funston would be
37 stabilized and elements could be adapted to accommodate visitor use and education.
38 Cultural landscape resources associated with San Francisco Bay Discovery Site National
39 Historic Landmark on Sweeney Ridge would be preserved, enhanced, and interpreted.
40 These actions would result in long-term, negligible and beneficial impact.

41 Alcatraz Island National Historical Landmark, which includes the entire island, presents
42 an intact cultural landscape comprising a wide range of archeological and historic
43 resources, structures, and features associated with its historical use as a Civil War fort,
44 military prison, lighthouse operation for maritime commerce, federal penitentiary, and

1 the Indian Occupation of 1969-71. Although this alternative would result in some
2 localized deterioration or loss of cultural landscape resources, it would provide for an
3 overall islandwide improvement in the condition of such resources. Actions under this
4 alternative would provide for some enhanced preservation and rehabilitation of cultural
5 landscape resources on the island. For instance, landscaped areas around the Main Prison
6 Building and Lighthouse would be rehabilitated to protect and interpret their layers of
7 history. The Parade Ground's cultural landscape would be rehabilitated, and rubble
8 would be removed. However, this alternative would also result in some localized
9 deterioration or loss of cultural landscape features on the island because some areas of the
10 island would be designed to accommodate visitor use and park and partner administration
11 and operations, while others would be allowed to revert to a more natural state. These
12 actions would have a long-term, negligible and beneficial impact.

13 ***Conclusion***

14 Throughout the park, alternative 1 would provide improved opportunities for
15 strengthening and enhancing the integrity of cultural landscape resources that contribute
16 to properties listed in the National Register of Historic Places or designated National
17 Historic Landmarks. Although actions under this alternative could result in localized loss
18 of some cultural landscape features due to increasing visitor opportunities, overall this
19 alternative would improve the integrity and enhance the preservation of the park's
20 cultural landscape features. These actions would have a long-term, negligible and
21 beneficial impact.

22 On Alcatraz Island, actions under this alternative would result in an overall islandwide
23 improvement in the condition of cultural landscape resources. Although, there may be
24 some localized deterioration or loss of some cultural landscape resources, the features in
25 the vicinity of all primary historic buildings would be rehabilitated. These actions would
26 have a long-term, negligible and beneficial impact.

27 Under this alternative, the Section 106 determination of effect on cultural landscape
28 resources in Golden Gate National Recreation Area and on Alcatraz Island would be *no*
29 *adverse effect*.

30 No impairment of cultural landscape resources would result from this alternative.

31 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

32 ***Analysis***

33 When compared to those of the no-action alternative, actions under alternative 2 would
34 generally provide for slightly better opportunities for strengthening the integrity and
35 adaptive use or interpretation of cultural landscape resources that contribute to properties
36 listed in the National Register of Historic Places or designated National Historic
37 Landmarks. More cultural landscape resources would be stabilized in this alternative, but
38 not as many would be rehabilitated, interpreted, and adaptively used. Coastal ecosystem
39 restoration of existing pastoral and rural landscapes could impact the integrity of some
40 cultural landscape resources. This alternative would require a detailed cultural landscape
41 resources stabilization and recovery plan. Although actions under this alternative could
42 result in localized loss of some cultural landscape resources, especially in the Natural and
43 Sensitive Resources management zones, actions under this alternative would generally

1 improve the integrity and enhance the preservation of the park's cultural landscape
2 resources, particularly in the Evolved Cultural Landscape and Historic Immersion
3 management zones. These actions would have a long-term, negligible to minor and
4 beneficial impact.

5 Cultural landscape resources in the Natural and Sensitive Resources management zones,
6 which cover much of the park land in this alternative, would be allowed to revert to a
7 more natural state, except where significant landscape resources could be preserved
8 without compromising natural resource values. Cultural landscape resources in the
9 Evolved Cultural Landscape and Historic Immersion management zones would be
10 identified and rehabilitated to emphasize their significant character-defining features
11 based on the level of historical documentation available.

12 Cultural landscape resources associated with the Hill 640 Military Reservation coastal
13 defense fortifications overlooking the Pacific Ocean and the southern end of Stinson
14 Beach that can be preserved without compromising natural resource values would be
15 afforded preservation treatment. Cultural landscape resources associated with the rural
16 pastoral landscape at the Rapozo Ranch (Miwok Stables), and Golden Gate Dairy in the
17 Tennessee Valley would be preserved through rehabilitation. Nonhistoric residences near
18 the Golden Gate Dairy could be removed if they do not contribute to essential community
19 services or park operations, and nonhistoric structures and facilities at the Repozo Ranch
20 would be removed, thus improving the integrity of their respective cultural landscapes.
21 Cultural landscape resources at Forts Barry and Cronkhite and the nearby Nike Missile
22 Site in the Marin Headlands would be preserved through rehabilitation. Cultural
23 landscape resources associated with historic coastal fortifications in the Marin Headlands
24 would be managed to perpetuate their historic values, and elements could be adapted to
25 accommodate visitor use or park and partner administration. Cultural landscape resources
26 associated with coastal defense fortifications in the Kirby Cove area, as well as those
27 associated with the Point Bonita Lighthouse and Lifesaving Station and Fort Miley,
28 would be preserved through rehabilitation. Cultural landscape resources associated with
29 the Montara Lighthouse, which constitute the only complete lighthouse facility in the
30 park, would be preserved through rehabilitation. Cultural landscape resources in Upper
31 Fort Mason (Fort Mason Historic District) would be preserved through rehabilitation or
32 restoration.

33 Cultural landscape resources associated with Battery Davis at Fort Funston would be
34 stabilized. Other cultural landscape resources at Fort Funston that can be preserved
35 without compromising natural resource values would be afforded preservation treatment.
36 Cultural landscape resources associated with historic coastal defense fortifications on
37 Milagra Ridge, Sweeney Ridge, and other locations in San Mateo County that can be
38 preserved without compromising natural resource values would be afforded preservation
39 treatment. As the park's information database increases for cultural landscape resources
40 in and near the Phleger Estate and other locations in the San Mateo County area, the
41 significance and preservation treatment of some landscape features may also increase.
42 Historic agriculture-related buildings at Rancho Corral de Tierra that can be preserved
43 without compromising natural resource values would be afforded preservation treatment
44 if determined eligible for listing in the National Register of Historic Places. Cultural
45 landscape resources associated with San Francisco Bay Discovery Site National Historic

1 Landmark on Sweeney Ridge would be preserved, enhanced, and interpreted. The
2 majority of the actions listed above would have a long-term, negligible and beneficial
3 impact while some natural resource restoration efforts would result in long-term, minor
4 and adverse impact.

5 Under alternative 2, many of the cultural landscape resources on Alcatraz Island would
6 become ruins. A cultural landscape benchmark/threshold evaluation stabilization plan is
7 needed to determine the minimum level of cultural landscape resource integrity needed to
8 retain Alcatraz Island National Historic Landmark designation. Furthermore, many of the
9 island's cultural landscape features would only be stabilized, and some could be lost
10 overtime.

11 The landscaped areas between the entry pier and the Main Prison Building and in the
12 vicinity of the Main Prison Building, Lighthouse, and Recreation Yard would be afforded
13 preservation treatment to interpret their layers of history. The Recreation Yard would be
14 rehabilitated or restored, while the Parade Ground would be stabilized as ruins and its
15 rubble piles retained to serve as bird habitat. Other cultural landscape resources would be
16 stabilized, rehabilitated, allowed to deteriorate naturally after Historic American Building
17 Survey recordation, or removed, depending on their condition, integrity, interpretive
18 value, and suitability for adaptive use. The impacts on Alcatraz Island would range from
19 long-term, negligible and beneficial to moderate and adverse.

20 ***Conclusion***

21 Alternative 2 would generally provide for some opportunities for strengthening the
22 integrity and adaptive use or interpretation of cultural landscape resources that contribute
23 to properties listed in the National Register of Historic Places or designated National
24 Historic Landmarks. The coastal ecosystem restoration and rehabilitation of existing
25 pastoral and rural landscapes could impact the integrity of some cultural landscape
26 resources. The majority of the actions listed above would have a long-term, negligible
27 and beneficial impact while some natural resource restoration efforts would result in
28 long-term, minor and adverse impact.

29 Under this alternative, more cultural landscape resources on Alcatraz Island would
30 become ruins, many of the island's cultural landscape features would only be stabilized,
31 and some could be lost overtime. The impacts on Alcatraz Island would range from long-
32 term, negligible and beneficial to moderate and adverse.

33 Under this alternative, the Section 106 determination of effect on cultural landscape
34 resources in Golden Gate National Recreation Area would be *no adverse effect* and for
35 cultural landscape resources on Alcatraz Island the determination would be *adverse*
36 *effect*.

37 No impairment of cultural landscape resources would result from this alternative.

38 ***Alternative 3: Focusing on National Treasures***

39 ***Analysis***

40 Under alternative 3, historically significant cultural landscape resources that have
41 integrity would be rehabilitated and adaptively used to showcase the park's military,
42 maritime commercial, and agricultural/ranching history themes and to support visitor

1 programming and services. The condition of all primary cultural landscape resources
2 would be improved, and when compared with the other alternatives in this plan, this
3 alternative would provide for the most comprehensive improvement, preservation, and
4 rehabilitation of cultural landscape features. Thus, implementation of this alternative
5 would result in significant efforts to preserve and restore cultural landscape resources in
6 “good” condition and for public accessibility to the greatest number of cultural landscape
7 features reflecting all eras and themes (particularly historic military themes in the Marin
8 Headlands and historic maritime commercial themes) of the park’s history. Although
9 actions under this alternative could result in some localized adverse effects on some
10 cultural landscape resources or some components and features in order to enhance visitor
11 access to and understanding of the park’s resources or facilitate park operations
12 functions, overall this alternative would generally have comprehensive beneficial impacts
13 on the park’s cultural landscape resources.

14 Actions in alternative 3 would require extensive stabilization, rehabilitation, and
15 restoration of cultural landscape features, and it would create opportunities for creative
16 interpretive programs, visitor services, and development of cultural resource stewardship
17 programs. Cultural landscape resources associated with the Hill 640 Military Reservation
18 would be preserved. Cultural landscape resources associated with the pastoral landscape
19 at the Golden Gate Dairy in the Tennessee Valley would be preserved through
20 rehabilitation. Cultural landscape resources at the Repozo Ranch (Miwok Stables) in
21 Tennessee Valley would be managed to perpetuate their historic values. Elements could
22 be adapted to accommodate visitor use/education. Cultural landscape resources
23 associated with Forts Barry and Cronkhite, the nearby Nike Missile Site, and the Kirby
24 Cove area would be rehabilitated and interpreted. Cultural landscape resources associated
25 with historic coastal defense fortifications in the Marin Headlands would be rehabilitated
26 and interpreted. Cultural landscape resources associated with the Montara Lighthouse, the
27 park’s only complete intact light station complex, would be rehabilitated or restored.
28 Nonhistoric structures would be removed from the site to improve the integrity of its
29 cultural landscape. Cultural landscape resources associated with the Point Bonita
30 Lighthouse would be preserved through rehabilitation. Cultural landscape resources
31 associated with Upper Fort Mason (Fort Mason Historic District) would be preserved and
32 rehabilitated, and some could be adapted to accommodate visitor use or park and partner
33 administration. Cultural landscape resources associated with West Fort Miley, the *USS*
34 *San Francisco* Memorial, and Marine Exchange Lookout Building (Octagon House)
35 would be preserved through rehabilitation. Significant character-defining features of the
36 cultural landscape at East Fort Miley would be preserved, although some elements could
37 be modified to enable park operations functions. Cultural landscape resources associated
38 with coastal defense fortifications on Milagra Ridge, Sweeney Ridge, and other locations
39 in San Mateo County that can be preserved without compromising natural resource
40 values would be afforded preservation treatment. As the park’s information database
41 increases for cultural landscape resources in and near the Phleger Estate and other areas
42 in San Mateo County, the significance and preservation treatment of some landscape
43 features may also increase. Cultural landscape resources at Rancho Corral de Tierra that
44 can be preserved without compromising natural resource values would be afforded
45 preservation treatment if determined eligible for listing in the National Register of
46 Historic Places. Cultural landscape resources associated with San Francisco Bay

1 Discovery Site NHL would be preserved, rehabilitated, and interpreted. The above
2 actions would result in negligible and beneficial impacts.

3 This alternative, which is designed to enhance the contributing features of Alcatraz Island
4 National Historic Landmark, would provide for a general islandwide improvement in the
5 condition of cultural landscape resources. The condition of all primary cultural landscape
6 resources and features on Alcatraz Island would be improved, especially those resources
7 within the Historic Immersion management zone that covers a significant portion of the
8 island. Although actions under this alternative could result in some localized adverse
9 effects on Alcatraz Island National Historic Landmark's individual cultural landscape
10 resources in order to enhance visitor access to and understanding of the island's
11 resources, overall this alternative would generally have comprehensive beneficial impacts
12 on the landmark's cultural landscape resources.

13 Actions under this alternative would require extensive stabilization, rehabilitation, and
14 restoration of historic buildings, and it would provide for increased opportunities for
15 creative interpretive programs, visitor services, and the development of cultural resource
16 stewardship programs. The goal is to provide opportunities to immerse visitors in the
17 island's historic prison landscape in the vicinity of Building 64, re-creating the
18 atmosphere evocative of its layers of history. In the vicinity of the Main Prison Building
19 and adjacent areas (including the landscaped areas in the vicinity of the Guard House and
20 Warden's House), visitors would also have access to the widest range of cultural
21 landscape resources and features in historically accurate conditions that tell stories about
22 the different layers of island history. Treatments ranging from upgrades to exhibits and
23 furnishings to more complete landscape restoration would continue with the goal of
24 access to and interpretation of the landscape's features. The park staff would also manage
25 most of the adjacent landscaped areas, such as the Parade Ground, to reinforce the sense
26 of history as visitors move around the island. The Parade Ground would be rehabilitated
27 to portray its historic periods and support year-round visitor exploration. Design for the
28 Parade Ground's rehabilitation would incorporate measures for wildlife habitat and
29 removal of the rubble piles.

30 The landscaped area around the Lighthouse would be preserved to provide visitors with
31 opportunities to learn about the maritime commercial history of Alcatraz Island and its
32 strategic location in San Francisco Bay. The perimeter of the island, including the coast
33 cliffs, would be managed to support interpretation of the island's cultural and natural
34 history and to provide greater access for visitors. Cultural landscape resources along the
35 island's perimeter would be stabilized, rehabilitated, allowed to deteriorate naturally, or
36 removed depending on their condition and integrity, interpretive value, and suitability for
37 adaptive use. The historic 1,000-foot "no trespass" zone around the island would be re-
38 established, demarcated by buoys circling the island. The above actions would result in
39 negligible and beneficial impacts.

40 ***Conclusion***

41 In alternative 3, the historically significant cultural landscape resources that have
42 integrity would be rehabilitated and adaptively used to showcase the park's military,
43 maritime commercial, and agricultural/ranching history themes and support visitor
44 programming and services. Implementation of this alternative would result in a
45 comprehensive effort to improve, preserve, and rehabilitate the cultural landscape

1 resources in “good” condition and for public access to the greatest number of cultural
2 landscape features, reflecting all eras and themes (particularly historic military themes in
3 the Marin Headlands and historic maritime commercial themes) of the park’s history. The
4 above actions would result in negligible and beneficial impacts.

5 On Alcatraz Island, this alternative would provide for a general islandwide improvement
6 in the condition of all primary cultural landscape resources and features preserved in
7 “good” condition and for public access to the greatest number of such resources and
8 features reflecting all eras of the island’s history. The above actions would result in
9 negligible and beneficial impacts.

10 Under this alternative, the Section 106 determination of effect on cultural landscape
11 resources in Golden Gate National Recreation Area and on Alcatraz Island would be *no*
12 *adverse effect*.

13 No impairment of cultural landscape resources would result from this alternative.

14

15 **Museum Collections**

16 ***No Action Alternative***

17 ***Analysis***

18 According to 2006 *NPS Management Policies*, the National Park Service will collect,
19 protect, preserve, provide access to, and use objects, specimens, and archival collections
20 to aid understanding among park visitors, and to advance knowledge in the humanities
21 and sciences. Further, museum collections management facilities need to accommodate
22 the special needs of museum collections for long-term preservation and protection by
23 ensuring that they are stored in energy efficient buildings. Director’s Order 24: *Museum*
24 *Collections Management Guideline* (September 2008) provides further guidance,
25 standards, and requirements for preserving, protecting, documenting, and providing
26 access to and use of National Park Service museum collections.

27 Golden Gate National Recreation Area’s 2008 *Collection Management Report*
28 documented 4,210,322 items in the park’s museum collections, which include a vast
29 array of materials that particularly focus on the park’s coastal defense fortifications and
30 military installations. Additionally, the park’s museum collections includes items from
31 Alcatraz Island, such as original FBI evidence from the 1962 Alcatraz escape, as well as
32 original uniforms, other accoutrements, and everyday objects from the island. The park’s
33 museum collections are currently stored in 15 different facilities throughout the park that
34 function as visitor centers, interpretive exhibits, or dedicated storage areas. Of the four
35 largest storage repositories, three are located in buildings owned by the Presidio Trust
36 with no lease agreements in place. This places the park’s museum collections in a
37 vulnerable position because of potential eviction and deteriorating structural conditions.
38 The park staff are monitoring the collections and taking steps to resolve these issues. The
39 current conditions for museum collections at the park do not meet NPS standards for
40 long-term preservation, protection, and use and would result in long-term, moderate and
41 adverse impacts.

42

1 Currently, the Golden Gate National Recreation Area’s museum collections, which
2 contain a vast array of materials that particularly focus on the park’s coastal defense
3 fortifications and military installations, are stored in various facilities throughout the park
4 that function as visitor centers, interpretive exhibits, or dedicated storage areas. The
5 current conditions for museum collections at the park do not meet National Park Service
6 standards for long-term preservation, protection, and use. Thus, continuation of current
7 management of the park’s museum collections would be expected to have long-term,
8 moderate, adverse impacts on the park’s museum collections.

9 No impairment of museum collections would result from this alternative.

10 ***Alternative 1: Connecting People with the Parks***

11 ***Analysis***

12 In addition to the actions proposed for the park’s museum collection described under the
13 “Actions Common to All Action Alternatives” section, alternative 1 would allow for the
14 incorporation of artifacts into the visitor experience on a case-by-case basis at sites that
15 are managed for historic immersion. This action would help visitor to better understand
16 the historic context of a particular site. Use of these artifacts would still require that they
17 be used in a way that meets NPS standards for preserving the museum collections.

18 Although the increased display of items could result in negligible to minor, long-term,
19 adverse impacts to some items in the collections, the public ’s awareness of the park’s
20 museum collections would be increased and could result in increasing donations and
21 support for “growing” and conserving the collections, thus resulting in overall long-term,
22 negligible, and beneficial effects.

23 ***Conclusion***

24 Incorporating the park’s museum collections in ways that enhance the visitor experience
25 and helps expose the values of the collection while still meeting NPS preservation
26 standards will have a long-term, negligible, beneficial impact on the value of the
27 collection.

28 No impairment of museum collections would result from this alternative.

29 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

30 ***Analysis***

31 In addition to the actions proposed for the park’s museum collection described under the
32 “Actions Common to All Action Alternatives” section, the actions under alternative 2
33 would increase the ecosystem management approach of the alternative by generating
34 more specimens for the natural research collection. This action would contribute to the
35 monitoring and studies associated with influence that climate change could have on the
36 park’s natural resources. The result of improving the natural resource portion of the
37 museum collection could result in improved understanding of park resources and to
38 increased access for researchers and managers to a body of knowledge that is necessary
39 for future management decisions. The actions under alternative 2 would have a long-
40 term, negligible, and beneficial impact to the park’s museum collections.

41

1 **Conclusion**

2 The increased emphasis of collecting and preserving natural resource specimen would
3 have a long-term, negligible, and beneficial, impact to the park’s museum collections.

4 No impairment of museum collections would result from this alternative.

5 **Alternative 3: Focusing on National Treasures**

6 **Analysis**

7 In addition to the actions proposed for the park’s museum collection described under the
8 “Actions Common to All Action Alternatives” section, the actions under alternative 3
9 would include treatments of historic buildings and cultural landscape resources that range
10 from upgrades to exhibits and furnishings to more complete restoration. The goal of these
11 actions would be increasing access to and interpretation of some of the park’s most
12 significant resources. A larger number of artifacts and archival items would be
13 prominently displayed for visitor education and interpretation under this alternative, thus
14 enhancing the visitor experience, resulting in a beneficial effect. Although the increased
15 display of items could result in negligible to minor, long-term, adverse impacts to some
16 items in the collections, the public’s awareness of the park’s museum collections would
17 be increased and could result in increasing donations and support for “growing” and
18 conserving the collections, thus resulting in overall long-term, negligible, and beneficial
19 effects.

20 **Conclusion**

21 Incorporating the park’s museum collections in ways that enhance the visitor experience
22 and helps expose the values of the collection while still meeting NPS preservation
23 standards will have a long-term, negligible, beneficial impact on the value of the
24 collection.

25 No impairment of museum collections would result from this alternative.

26

1 **VISITOR USE AND EXPERIENCE**

2 **No Action Alternative**

3 ***Analysis***

4 In the no-action alternative, visitors would continue to access a diversity of recreational
5 opportunities in a wide range of settings throughout Golden Gate National Recreation
6 Area (park). The park's extensive system of hiking, bicycling, and horseback riding trails
7 would be available for visitors and residents. Overnight camping and lodging
8 opportunities would continue. Beach recreation, along with wildlife viewing and scenic
9 touring, would also be important components of the visitor experience. Continuing these
10 visitor opportunities provide for a long-term, moderate, beneficial impact to the visitor
11 experience.

12 During scoping and in recent visitor surveys, most respondents acknowledged their
13 enjoyment of the park's visitor opportunities and suggested that the amount of activities
14 should be maintained close to current levels. Some people noted concerns about any
15 further regulation or reduction of recreation opportunities, particularly for mountain
16 bikers, horseback riders and dog owners. There was also interest in additional recreation
17 opportunities, particularly more and different trail connections to increase the diversity of
18 recreation and access options, and in improving the design and maintenance of trails.
19 There were some concerns expressed about conflicts between recreation activities that
20 share facilities and areas, such as bicyclists and horseback riders, and pedestrians and
21 dogwalkers. The park staff would continue to work to improve upon these conflict
22 situations and conditions that currently contribute to long-term, minor, adverse impacts
23 within the park.

24 A variety of educational and interpretive programs would continue to be offered by the
25 NPS and its partners throughout the park. Visitors would continue to learn about the
26 park's coastal ecology, and military and ranching history. Visitors would also continue to
27 have opportunities for hands-on stewardship activities. Continuing the current
28 opportunities would have a long-term, minor, beneficial impact. Some of the public has
29 expressed interest in having more interpretive and educational opportunities, including
30 more on-site interpretive materials and programs, a visitor center in Marin and the San
31 Mateo area, and more outreach to the local and regional population. In addition, there has
32 been a need expressed for increasing outreach to diverse audiences to provide more
33 knowledge about the park resources as well as visitor opportunities. Access to the park's
34 museum collection and integration of the collection into interpretive and educational
35 programming and facilities have been identified as needs. This alternative would not
36 provide these new opportunities, resulting in a long-term, minor, adverse impact.

37 Visitor access to the various park sites would continue via multiple modes of auto, transit,
38 bicycle, and pedestrian access. Many park sites are accessible via one or more modes of
39 transportation. However, some park sites are challenging to reach and enjoy, given
40 limited parking infrastructure, congested roadways, and use conflicts between autos and
41 bicyclists/pedestrians. Some of the areas where this is a more serious concern include
42 Stinson Beach, Muir Beach, Marin Headlands and Mori Point. There has been a
43 significant amount of feedback from the public to explore the expansion and

1 enhancements of alternative modes of access to and between park sites to provide easier
2 access, reduced traffic congestion and orientation opportunities. In addition, the need for
3 more signs, maps and orientation information to help visitors explore the national
4 recreation area has been mentioned. Visitor's have access to most of the sites within
5 Golden Gate National Recreation Area. There are some areas that have restricted access
6 to protect sensitive resources or visitor safety. In addition, some areas are restricted for
7 certain types of activities. The new parklands in San Mateo County have minimal
8 facilities and services to support visitation, but access is permitted. Overall, the issues
9 regarding access have resulted in long-term, minor to moderate, adverse impact on the
10 visitor experience.

11 Finally, there are locations within the park where visitor safety is an issue. Use conflicts
12 between multiple modes of transportation are a concern in certain areas. Use conflicts
13 between types of recreation activities can also occur and cause both real and perceived
14 safety problems such as conflicts between bicyclists and horseback riders. In addition, the
15 national recreation area faces safety concerns that are typical of being in close proximity
16 to a large urban area. The actions described above would have a long-term, minor to
17 moderate adverse impacts on the visitor experience.

18 On Alcatraz Island, the primary visitor activities of visiting the cellhouse and enjoying
19 the sights and sounds of the island in the middle of the bay would continue in this
20 alternative; a long-term, moderate, beneficial impact. The existing interpretive programs
21 would also continue to focus primarily on the military history and federal prison-era
22 stories. In addition, visitors would have opportunities for self-discovery on only a small
23 portion of the island

24 During scoping for the plan, there were some mentions of additional recreation
25 opportunities that were desired including more trail access around the island, more access
26 to a larger number of structures, and overnight opportunities. Further, some visitors have
27 expressed interest in more diverse interpretive programs, including more opportunities in
28 exploring and understanding the Civil War military fortifications and prison. Visitors are
29 provided limited opportunities to explore the historic military fortification and citadel that
30 are located under the federal prison. The lack of some of these desired improvements
31 would be a long-term, minor to moderate, adverse impact on those visitors seeking these
32 opportunities.

33 Alcatraz continues to provide outstanding opportunities for understanding the stories and
34 structures associated with the federal penitentiary period of the island. The audio tour is
35 popular with visitors and gives them an excellent understanding of life on "the Rock."
36 The audio tour has also provided a means to better distribute the flow of visitors and
37 reduce noise associated with large groups visiting the cellhouse. The NPS and its partners
38 have also managed the levels of use visiting the island to help control issues associated
39 with crowding and conflicts resulting in a long-term, moderate, beneficial impact. There
40 are isolated occasions and certain locations where crowding and use conflicts do occur
41 resulting in long-term, minor, adverse impacts. In particular, certain locations along the
42 walk to the cellhouse can sometimes become crowded, and there are occasional conflicts
43 between the visitor tram and pedestrians during high use days.

1 Alcatraz Island also supports one of the largest concentrations of colonial nesting
2 waterbirds in San Francisco Bay. Visitors have some opportunities to learn about and
3 observe the colonies as part of their visit to the island; a long-term, minor, beneficial
4 impact for visitors interested in understanding the important role the island plays in the
5 ecological system of the bay. However, many areas of the island are currently closed
6 during breeding season to protect the colonies from human disturbance. This results in
7 long-term, minor, adverse impacts to visitors that may want to explore these areas. In
8 addition, the sights and smells associated with large numbers of birds during the nesting
9 season has resulted in some minor, adverse impacts to the visitor experience.

10 Visitors have access to the island via the NPS concessionaire-run ferry. The ferry ride to
11 the island is one of the highlights of the visitor experience given the views of the island
12 and the city, along with the orientation and interpretive information provided; a long-
13 term, minor, beneficial impact. There are times when tickets are sold out to the island and
14 some visitors are unable to take a trip to the island at their desired date and time resulting
15 in a long-term, moderate, adverse impact on the visitor experience. During scoping for
16 this plan, some members of the public expressed interest in having alternative access
17 opportunities to the island by motorized and nonmotorized boats. This alternative would
18 not explore additional access opportunities causing a long-term, minor, adverse, impact.

19 Visitor safety at Alcatraz Island is generally good in the no action alternative, although
20 there are some safety issues associated with the deteriorating condition of historic
21 structures; long-term, minor, adverse impact.

22 **Conclusion**

23 The no-action alternative for Golden Gate National Recreation Area would result in long-
24 term, minor to moderate, beneficial impacts from continued opportunities to access high-
25 quality resource-dependent visitor opportunities and experience the natural, historic, and
26 scenic qualities of the park. Visitors would have extensive trail, beach, and educational
27 opportunities, which are some of the most valued activities in the park. However, minor
28 to moderate adverse impacts on the visitor experience from traffic congestion, use
29 conflicts, limited facilities in San Mateo County, and restricted to access to a few desired
30 locations would continue.

31 The no-action alternative for Alcatraz Island would result in long-term, minor to
32 moderate, beneficial impacts from continued opportunities to access the cellhouse and the
33 immediate surrounding landscape. In addition, high quality interpretive and educational
34 programs and materials would continue to be provided. However, minor to moderate
35 adverse impacts on the visitor experience from conflicts with birds, limited access to
36 areas and structures on the island, and some visitor crowding would continue.

37

38

1 **Alternative 1: Connecting People with the Parks (NPS Preferred**
2 **Alternative for park sites in Marin, San Francisco, and San Mateo**
3 **counties, except Alcatraz Island)**

4 ***Analysis***

5 The emphasis of the alternative 1 for the Golden Gate National Recreation Area, is
6 connecting people with the parks. This alternative would increase the diversity of
7 recreational opportunities offered throughout the park and encourage wider participation
8 by the local and regional population, including those that are not traditional park visitors.
9 The establishment of recreation “portals,” or locations from which multiple activities may
10 be staged and initiated, is a primary component of this alternative. These portals would
11 better support access to a diversity of recreation opportunities, and help connect visitors
12 with the information and support services they need to plan and enjoy their visit to the
13 park. The above efforts to welcome and orient the park visitor would have a long-term,
14 moderate, beneficial impact on the visitor use and experience at the park.

15 Rehabilitation, expansion, and upgrades to existing facilities, including trails, trailheads,
16 campsites, picnic areas and parking would better support visitor activities throughout the
17 park, including community based park stewardship programs. In particular,
18 enhancements to the park’s trails would be beneficial since the trails are one of the most
19 important aspects of visitor opportunities, and these improvements were highly sought
20 after by the public. New facilities are also proposed in key park locations in this
21 alternative including “warming huts,” camping / primitive overnight accommodations,
22 picnic facilities and trails. These facilities would have a long-term, moderate, beneficial
23 effect on enhancing visitor opportunities and better facilitating visitor activities
24 throughout the parklands.

25 Existing recreation activities would be continued and better supported through the
26 facilities and access improvements already mentioned. Some activities would be
27 expanded in this alternative including overnight activities, educational and stewardship
28 opportunities, and equestrian programs and facilities. These activities would allow the
29 park staff to engage a wider audience and better demonstrate the unique and interesting
30 resources found throughout the parklands. Further, scenic viewing throughout the park
31 would be enhanced at key points through the addition of overlooks, landscape and facility
32 restoration, and improvements for non-auto access to park sites. The above actions would
33 result in long-term, moderate, beneficial, impacts.

34 Restrictions on public access in sensitive resource zones would have some long-term,
35 minor, adverse impact on visitor access and opportunities for recreation, but an effective
36 educational programming and information associated with these areas could also improve
37 visitor understanding of these highly sensitive and exceptional resources.

38 Stewardship, leadership, and volunteer activities would be enhanced in this alternative, a
39 long-term, moderate, beneficial, impact. New stewardship and educational facilities are
40 proposed at several park locations. Efforts for programming and educational materials by
41 park staff and partners would be purposively aimed at engaging a wider audience, as well
42 as enhancing individual understanding of park resources and values.

1 Public access to park sites, including parking improvements, public transportation
2 connections, and multimodal access would be enhanced as a result of the alternative,
3 resulting in long-term, moderate beneficial impacts. Improved public transportation
4 opportunities would help connect a larger audience to park sites, better connect visits
5 between sites and reduce use conflicts. Further, some of the improvements would allow
6 for easier access to busy sites, reducing visitor frustration and improving the quality of
7 park visits.

8 Visitor safety would benefit by several actions in this alternative resulting in long-term,
9 moderate beneficial impacts. Access improvements to Highway 1 and Panoramic
10 Highway would include better wayfinding, overlooks for safe scenic viewing and more
11 separation between auto and bicycle use. Other safety improvements include
12 enhancements to multi-modal transportation options to ease use conflicts and road
13 congestion during peak times. Finally, increased ranger presence throughout the
14 parklands, particularly in San Mateo County, would improve response capabilities for
15 park staff. However, the addition of new multi-use trails may cause a small amount of
16 increased conflicts among visitors.

17 On Alcatraz Island, alternative 1 would offer a wider variety of settings and experiences
18 for visitors to enjoy. In addition to telling the stories of the infamous prison history, the
19 National Park Service would offer visitor opportunities to understand other historic
20 periods and the island's natural history, as well as enjoy a diversity of scenic and
21 recreational experiences on the island, including spaces to hold special events.
22 Alternative 1 calls for increased building preservation, interpretation, and adaptive reuse
23 of buildings. All of these actions would expand the range of activities for visitors and
24 allow them to better understand the lives of people who lived and worked in those
25 buildings resulting in long-term, moderate beneficial impacts. The diversity of
26 experiences on the island may encourage return visits, especially from San Francisco area
27 residents, which might increase visitation in the off-season.

28 The diversity of activities would greatly increase, especially given that more buildings
29 and landscapes would be open to the public allowing for exploration of all layers of the
30 island's history, natural resources, and stories. In addition to increased access to more
31 buildings and surrounding landscapes, additional trails around the island's perimeter,
32 program opportunities, and overnight experiences would be explored in this alternative.
33 Further, this alternative would increase visitor amenities at key locations including food
34 service at Building 64. Finally, this alternative includes additional strategies in core
35 visitor use areas, such as removal of the rubble piles on the parade grounds, to minimize
36 the conflict between visitors and birds; increasing access and improving the experience in
37 these areas. This wider range of activities, settings and services would likely appeal to a
38 wider audience of participants and would also likely encourage an increase in repeat
39 visitation. Further, this alternative would allow for a greater dispersion of visitors
40 throughout the island, helping to minimize crowding at key sites like the cellhouse. The
41 above actions would have a long-term, moderate, beneficial impact on the visitor
42 experience.

43 Visitor understanding, education, and interpretation would be greatly enhanced in this
44 alternative, a long-term, moderate beneficial impacts, given the higher level of
45 preservation of the buildings, increased access to the structures and surrounding

1 landscapes, and more diverse programming options. Stewardship activities would be a
2 focus of this alternative to increase visitors' understanding and appreciation of the unique
3 and diverse natural and cultural resources on the island.

4 Visitor safety would be benefited through the preservation of the buildings as well as
5 through increased bird management resulting in long-term, minor, beneficial impacts.
6 While reduced crowding could increase safety in some areas, allowing visitors to explore
7 more of the islands rugged and natural settings could bring about more incidents.

8 **Conclusion**

9 The actions proposed in alternative 1 for Golden Gate National Recreation Area would
10 result in long term, moderate, beneficial impacts to the visitor experience. The diversity
11 of recreational opportunities provided, the enhancements to facilities, and the purposeful
12 effort to engage a more diverse audience would have a positive and important impact on
13 the visitor experience to the national recreation area. Further, the emphasis on improved
14 access, particularly transportation connections, would be a beneficial impact on the
15 visitor experience by reducing traffic congestion and use conflicts.

16 Alternative 1 would result in long term, moderate, beneficial impacts to the visitor
17 experience on Alcatraz Island. The enhancements to the park setting through increased
18 preservation of the structures; the increased access to the island's various layers of
19 historic resources and natural settings; and the purposeful effort to increase programming
20 options and connect with a more diverse audience would be a long-term, moderate,
21 beneficial impact on the visitor experience at Alcatraz Island. The amount of visitors that
22 could be accommodated on the island may also be slightly increased upon
23 implementation of this alternative given the increased number of opportunities and the
24 ability to better disperse visitors; a long-term, minor, beneficial impact.

25

26 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

27 **Analysis**

28 Alternative 2 proposes a visitor experience that is focused on forging individual
29 connections with the park's natural and cultural resources through more natural and
30 challenging visitor opportunities and enhanced stewardship activities. Visitors would still
31 have a diversity of recreation activities available to them, but there would be an emphasis
32 on encouraging more self-reliant, backcountry-type experiences throughout the
33 parklands. For those visitors that enjoy solitude, natural quiet and some challenge during
34 their visit to the park, this alternative would generally be long-term, minor, and
35 beneficial. In addition, those visitors that enjoy connecting to the parklands via
36 stewardship and educational program participation would also benefit from this
37 alternative. However, for those visitors that prefer a wider range of activities and more
38 support services to facilitate their visit, this alternative would generally have some long-
39 term, minor, adverse impacts.

40 Some visitor facility improvements are proposed in this alternative for key locations
41 throughout all three counties. These facilities would improve access to select sites, better
42 connect sites within the park, and facilitate stewardship and education opportunities,

1 resulting in long-term, moderate, beneficial impacts. For example, upper Fort Mason
2 would serve as the primary portal for stewardship and participatory science activities with
3 access to programs throughout the park, allowing these opportunities to be better
4 marketed, coordinated, and facilitated. Alternative 2 also proposes the removal of some
5 facilities. While removal of facilities could have an adverse impact on the experience for
6 some visitors that relied on those facilities, it could also be beneficial to others who want
7 to immerse themselves in a more natural environment and participate in opportunities that
8 are more challenging.

9 Most of the park's current visitor activities would be maintained, however there may be
10 more regulations and restrictions on access to better protect resources in this alternative.
11 Further, visitor opportunities may be relocated and/or concentrated to reduce the
12 "footprint" on parklands and create a more sustainable system of recreation facilities.
13 Alternative 2 also recognizes several sensitive resource areas, and accordingly requires
14 limitations on visitor access to those areas. These restrictions and regulations could have
15 a long-term, minor to moderate adverse impact on some visitors in terms of visitor
16 opportunities, with the greatest effect on local visitors that frequent these areas on a
17 regular basis. Some of the areas with more substantial changes in visitor access and
18 regulations include Slide Ranch, Fort Funston, Mori Point, and the southern portion of
19 Ocean Beach.

20 Visitor activities associated with immersion in and exploration of natural and cultural
21 landscapes would be enhanced in this alternative, with plentiful opportunities for those
22 that seek solitude, quiet and contemplation. Trail connectivity and related improvements
23 would allow a more diverse visitor population to enjoy trail experiences with less conflict
24 and more focus on enjoying the setting. Scenic viewing would be enhanced in this
25 alternative through the removal of some facilities and addition of new overlooks.
26 Maintaining low levels of development, the strategic removal of some facilities, and
27 restoration of landscapes, would provide what many members of the public identified as
28 one of the most highly desired functions of the park: to act as a green retreat from the
29 urban environment of San Francisco. These actions would have a long-term, minor to
30 moderate, beneficial impact to visitors seeking these types of settings and opportunities.

31 Park staff and park partners would work towards more diverse, frequent and better
32 coordinated natural and cultural resource stewardship and restoration activities in this
33 alternative. Stewardship programs would allow local residents to better understand and
34 appreciate the natural settings within the park, and deepen participants' commitment to
35 long-term protection of its resources. Further, this alternative would include additional
36 programming and interpretation regarding the park's natural and cultural resources and
37 related stories. These learning opportunities would be enhanced through the extensive
38 trail system that would further highlight the park's diverse ecosystems and rich cultural
39 history and resulting in long-term, moderate beneficial impacts.

40 Access to some areas would become more difficult by personal vehicle and may
41 generally be more regulated, but associated public transportation services and non-
42 vehicular access options would be improved. Improved public transportation
43 opportunities would help connect a larger audience to park sites, better connect visits
44 between sites, and reduce use conflicts. Further, some of the improvements would allow
45 for easier access to busy sites, reducing visitor frustration and improving the quality of

1 park visits. These actions contribute to a long-term, moderate, beneficial impact. In
2 alternative 2, if a slide impacts Highway 1 near Slide Ranch in Marin County, NPS could
3 encourage Caltrans to stabilize and abandon this section of road. This action could
4 inconvenience local residents and park visitors traveling along this route and result in a
5 long-term, moderate, adverse impact.

6 Visitor safety would be better due to several actions in this alternative resulting in long-
7 term, moderate beneficial impacts. Access improvements to Highway 1 and Panoramic
8 Highway would include better wayfinding, overlooks for safe scenic viewing and more
9 separation between auto and bicycle use. Other safety improvements include
10 enhancements to multi-modal transportation options to ease use conflicts and road
11 congestion during peak times. Finally, increased ranger presence throughout the
12 parklands, particularly in San Mateo County, would improve response capabilities for
13 park staff.

14 On Alcatraz Island, alternative 2 would highlight the concept of isolation on the island
15 which is a recurrent theme in the island's cultural and natural history. The natural and
16 built landscape would continue to evolve and only the buildings and features needed to
17 preserve the island's historic landmark status would be preserved. Natural elements
18 would reclaim other features as part of the rewilding of Alcatraz Island. Visitors would
19 have opportunities to experience first-hand the island's isolation, natural systems, and
20 layers of history. In particular, visitors would have increased opportunities to learn about
21 the important role the island plays in the broader marine ecosystem, and why its isolation
22 made it such a strategic location for a military post and the infamous prison. There would
23 be increased opportunities for stewardship and outdoor learning.

24 Ecotourism, outdoor learning, and natural and cultural resource stewardship
25 programming would be the focus of this alternative, deepening the visitor's
26 understanding of these topics as they relate to the island. This would benefit visitors' with
27 interest in these topics and would encourage all visitors to take away more than just the
28 federal penitentiary story. The diversity of activities available on the island would be
29 increased given the additional emphasis on increasing visitors' understanding of the
30 natural resources on the island. This would include programming, stewardship, and
31 related overnight opportunities that would be new options for visitors to the island. There
32 would also be increased opportunities for wildlife and scenic viewing, and hiking around
33 the perimeter of the island. Expanding the visitor opportunities could have a long-term,
34 moderate, beneficial impact to the visitor experience. It is likely these actions would
35 appeal to a different audience than those that primarily visit for the island's historic
36 resources. However, the emphasis on promoting the natural values of the island would
37 also potentially increase the conflict between visitors and birds in core visitor use areas,
38 resulting the long-term, moderate, adverse impact on the visitor experience during the
39 nesting season. Further, there has been public interest in accessing many of the closed
40 buildings on the island and this alternative would increase visitor access to some while
41 continuing to limit access to others that could result in a long-term, minor, adverse
42 impact.

43 This alternative proposes additional visitor access restrictions in the waters surrounding
44 the island to protect coastal resources and seabird colonies. These regulations would have
45 an adverse impact on some visitors that enjoy navigating the waters in this area (via

1 private boats and harbor tours), and enjoying the views of the island from close-up
2 resulting in a long-term, minor, adverse impact to water-based recreation.

3 Preservation of the buildings and spaces where visitors would be allowed would result in
4 greater levels of visitor safety. There may be additional conflicts associated with visitors
5 and birds, but it is unlikely that these conflicts would result in any significant concerns
6 related to visitors' health and safety.

7 **Conclusion**

8 The actions proposed in alternative 2 for Golden Gate National Recreation Area would
9 result in long term, minor to moderate, beneficial impacts to the visitor experience. The
10 visitor experience would be improved regarding the depth and content of educational
11 programming, interpretation, and resource stewardship; along with the preservation and
12 promotion of visitor activities focused on immersion in the natural and cultural settings
13 unique to the national recreation area. Visitors would gain a better understanding of park
14 resources and values. However, the regulation and restrictions on some visitor activities
15 and locations might not encourage as much connection to the diverse local and regional
16 population, and may have a long-term, moderate, adverse impact on repeat visitors that
17 have a long-standing attachment to certain locations or activities that may be regulated or
18 restricted. On Alcatraz Island, alternative 2 would result in long-term, minor to moderate,
19 beneficial impacts to the visitor experience given the increased understanding and
20 appreciation of the island's important role in the marine ecosystem and related activities
21 and programming. However, there would be long-term, moderate, adverse impacts to the
22 visitor experience in this alternative due to the increased interaction and related conflicts
23 between visitors and birds during the nesting season, and the restricted access to desired
24 locations and structures on the island. The amount of visitors that could be
25 accommodated on the island would likely be the same or slightly increased upon
26 implementation of this alternative given the increased number of opportunities and the
27 ability to better disperse visitors; a long-term, negligible to minor, beneficial impact.

28

29 **Alternative 3: Focusing on National Treasures (The NPS preferred** 30 **alternative for Alcatraz Island)**

31 Alternative 3 proposes a visitor experience that is focused on the nationally significant
32 resources found throughout the park. Visitors would have a diversity of recreational and
33 educational opportunities centered on the park's iconic sights, structures, and stories.
34 There would be many opportunities for first-hand learning, the ability to immerse oneself
35 in a historic setting, and stewardship opportunities at key sites that would be preserved to
36 their highest level of quality, providing the best opportunity for visitors to understand and
37 forge a connection with the resources and values of the park, as well as the larger national
38 park system. Since the large expanse of undeveloped open space is one of the park's
39 fundamental resources and values, the park would still provide plentiful opportunities for
40 those visitors that enjoy solitude, natural quiet and some challenge during their visit.

41 Much of the visitor facility improvements in this alternative focus on rehabilitation of and
42 upgrades to existing facilities that would support visitor understanding and access to key
43 sites throughout the park. For Marin County, one of the most substantial differences in

1 this alternative occurs in the area within and around Fort Barry and Fort Cronkhite with
2 the structures and landscapes being restored to showcase the stories of military history
3 and the transition from Army post to national park. To facilitate visitors' visit and
4 understanding of this part of the park, a new visitor center would replace the housing
5 infrastructure at the Capehart housing area. In addition, trails and roads in the area would
6 be managed to connect visitors to the important historic and natural resource stories.

7 In San Francisco County, facility improvements include dedication of more structures at
8 Fort Mason to visitor services, with an emphasis on the area serving as the primary visitor
9 entrance to the park with improved orientation and educational services being provided.
10 In San Mateo County, the NPS would work in cooperation with surrounding cities and
11 the county to make the Pacific Coast Highway (Highway 1) a National Scenic Byway to
12 encourage a more unifying character to the road corridor, along with a coordinated
13 approach to visitor access and services. This would include transitioning the Sheldance
14 Nursery facilities to visitor support facilities, with improved access to Highway 1,
15 providing a convenient and accessible location for coordinated information services at the
16 entrance to San Mateo County. Further, facility improvements would include the
17 identification and development of recreation portals in Ranch Corral de Tierra, which
18 would better support access to a diversity of recreation opportunities, and help connect
19 visitors with the information and support services they need for a visit to this area of the
20 park. The above actions would expand visitor opportunities and access to park resources
21 and therefore contribute to a long-term, minor to moderate, beneficial impacts to the park
22 visitor.

23 Most of the existing recreation activities within the park would be continued and better
24 supported through the facilities and access improvements already mentioned. Activities
25 that would be expanded in this alternative include educational and stewardship
26 opportunities at key park sites. These activities would allow the park staff to engage a
27 wider audience and better demonstrate the park's fundamental resources and values,
28 particularly its coastal military defense structures and stories. Connected and improved
29 trails are also proposed in this alternative, along with more multi-use trails. The
30 expansion and enhancement of the park's already extensive trail system would allow for
31 greater opportunities to explore the park. Given the importance of trail opportunities to
32 the public, these improvements would be a long-term, moderate, beneficial impact. In
33 addition, this alternative provides for an increase in the diversity of overnight
34 opportunities, including primitive camping. These actions would increase the diversity of
35 recreational opportunities and were supported by the public during scoping for this plan.
36 Additional equestrian programs and expanded equestrian areas are proposed in San
37 Mateo County, allowing equestrian uses to expand in the park, which was encouraged by
38 some members of the public. The above actions would result in long-term, moderate
39 beneficial impacts.

40 Alternative 3 designates a few sensitive resource areas, and accordingly requires
41 limitations on visitor access to those areas. In addition, this alternative proposes changes
42 in the access and regulations for some key visitor use sites including Slide Ranch, Fort
43 Funston, and the southern portion of Ocean Beach. These restrictions and regulations
44 could have long-term, moderate, adverse, impacts on some visitors in terms of visitor

1 opportunities, with the greatest effect on visitors that frequent these areas on a regular
2 basis.

3 As already noted, this alternative includes proposals for enhanced understanding and
4 exposure to the park's most important resources and stories. In particular, the military
5 history and coastal fortifications at several sites along the coast and bay would be
6 highlighted using the latest technological and multimedia advances and associated
7 programming, giving visitors a deeper understanding of these nationally significant
8 structures. Stewardship centers located in the park would enhance community pride and
9 commitment in the park, and serve as places to teach the next generation of park stewards
10 resulting in long-term, moderate beneficial impacts.

11 Access and orientation to the park would generally be improved; a long-term, moderate,
12 beneficial impact. In particular, there would be an increased focus on linking key park
13 sites via multiple modes of transportation, which would help connect a larger audience to
14 park sites, better connect visits between sites, and reduce use conflicts. Trail
15 improvements and connections would be a primary element of this alternative. Trail
16 access improvements allow visitors more convenient and safe access to and between
17 areas within the park as well as surrounding communities and other public lands. Further,
18 this alternative proposes visitor hubs or portals (e.g., upper Fort Mason, and interagency
19 visitor centers at Pacifica and an area near Montara Light), which would provide
20 centralized orientation and services, improving visitors' ability to access sites throughout
21 the park.

22 Visitor safety would be better due to several actions in this alternative; a long-term,
23 minor, beneficial impact. Access improvements to Highway 1 and Panoramic Highway
24 would include better wayfinding, overlooks for safe scenic viewing and more separation
25 between auto and bicycle use. Other safety improvements include enhancements to multi-
26 modal transportation options to ease use conflicts and road congestion during peak times.
27 Finally, increased ranger presence throughout the park, particularly in San Mateo County,
28 would improve response capabilities for park staff. However, the addition of new multi-
29 use trails may cause a small amount of increased conflicts among visitors.

30 Alternative 3 is the NPS preferred alternative for managing the resources and visitors on
31 Alcatraz Island. This alternative would immerse visitors extensively in all of Alcatraz's
32 historic periods, providing the best opportunity for visitors to understand and forge a
33 connection with the resources and values of the island. The visitor's immersion in the
34 history of Alcatraz Island could be extended to the historic embarkation site at Fort
35 Mason's Pier 4 for the island's ferry. Visitors would have access to restored portions of
36 historic structures that would better tell the story of the various aspects of life on "the
37 Rock." Visitors to Alcatraz already highly value the interpretive and educational
38 programming of the island's historic resources, and this alternative would expand those
39 opportunities to include more immersive experiences, a setting that is more reflective of
40 the period of significance, and more direct access to the island's historic structures
41 resulting in a long-term, moderate, beneficial impact.

42 This alternative would greatly enhance the diversity of visitor activities offered on
43 Alcatraz Island. As noted, the emphasis for visitor opportunities would be on immersion
44 of the visitor in all layers of the island's history, with more programming and learning

1 options. In addition, restoration and opening to the public of buildings and landscapes
2 would allow visitors to more fully experience the sights and feeling of the historic
3 periods. Other special events, classes, and stewardship opportunities focused around the
4 resources and stories of the island's period of significance would also increase the
5 diversity of opportunities available to visitors. This increase in options would likely
6 appeal to a wider audience of participants and would also likely encourage an increase in
7 repeat visitation. There has been a significant amount of public interest in understanding
8 and exploring more of the island's structures and landscapes to better understand the
9 many layers of Alcatraz history. Further, this alternative would allow for a greater
10 dispersion of visitors throughout the island, helping to minimize crowding at key sites
11 like the cellblock. The above actions of opening more of the island and its historic
12 structures, recreating many of the historic settings, and increasing park programs will
13 have a long-term, moderate, beneficial influence to the visitor use and experience of the
14 island's resources.

15 This alternative proposes additional visitor access restrictions in the waters surrounding
16 the island to replicate the historic no-trespass zone as well as protect coastal resources
17 and seabird colonies. These regulations would have an adverse impact on some visitors
18 that enjoy navigating the waters in this area (via private boats and harbor tours), and
19 enjoying the views of the island from close-up resulting in long-term, minor, adverse
20 impacts to water-based recreation.

21 Visitor understanding, education, and interpretation would be greatly enhanced in this
22 alternative given the higher level of preservation of the buildings, increased access to the
23 structures and surrounding landscapes, and more diverse programming options. In
24 addition, stewardship activities would provide increased visitors understanding and
25 appreciation of the island's natural and cultural resources.

26 Visitor safety would result in long-term, minor, beneficial impact through the
27 preservation of the buildings as well as through increased bird management. While
28 reduced crowding could increase safety in some areas, allowing visitors to explore more
29 of the islands rugged and natural settings could bring about more incidents.

30 **Conclusion**

31 The actions proposed in alternative 3 for Golden Gate National Recreation Area would
32 result in long term, moderate, beneficial impacts to the visitor experience. The most
33 significant beneficial effect of this alternative would be the increased opportunities for
34 visitors to understand, appreciate, and take part in the preservation of the park's most
35 fundamental resources and values. In addition, this alternative would improve access and
36 connectivity to and between key sites in the park, facilitating the visitor experience, and
37 reducing use conflicts and visitor frustration. However, this alternative would change
38 visitor opportunities at a few existing use areas, leading to long-term, minor to moderate,
39 adverse impacts on visitors that currently frequent these locations for various recreation
40 activities.

41 Alternative 3 is the NPS preferred alternative for managing Alcatraz Island and would
42 result in long term, moderate to major, beneficial impacts to the visitor experience,
43 primarily due to the opportunity to immerse oneself in the historic periods of Alcatraz
44 Island. The island's history, particularly the military and the federal penitentiary, is of

1 primary interest to most visitors to the island. This alternative would bring the experience
2 alive, illustrating more aspects of life on “the Rock,” for a greater diversity of visitors.
3 The amount of visitors that could be accommodated on the island may also be slightly
4 increased upon implementation of this alternative given the increased number of
5 opportunities and the ability to better disperse visitors; this would result in long-term,
6 minor to moderate, beneficial impacts on the visitor use and experience.

7

8 **SOCIAL AND ECONOMIC ENVIRONMENT**

9 **Introduction**

10 The analysis of impacts to the social and economic environment of the gateway
11 communities and overall Bay Area that surrounds Golden Gate National Recreation Area
12 and Muir Woods National Monument is based on the topic research and professional
13 judgment of planners who have experience with similar projects. To help identify the
14 impacts of the various alternatives, the social and economic environment is described by
15 three primary contributing factors: quality of life, population demographics, and local
16 economy. These three factors reflect the three main areas of discussion in the Social and
17 Economic Affected Environment section. Also, in terms of geographic scope, the impact
18 analyses in this section primarily focus on the social and economic conditions of the local
19 gateway communities around the parks and the three adjacent counties of Marin, San
20 Francisco, and San Mateo since this is where the majority of impacts would be most
21 noticeable. However, the analyses will also identify if and when potential impacts might
22 extend beyond the gateway counties to a more regional impact on the Bay Area.

23 In the discussion of impacts to the social and economic environment, an analysis section
24 and conclusion section are included for each alternative for Golden Gate National
25 Recreation Area including Alcatraz Island and Muir Woods National Monument,
26 including the no-action alternative. Also, the analysis begins with a section that addresses
27 the impacts from actions that are common to all action alternatives for both Golden Gate
28 National Recreation Area and Muir Woods National Monument. To help with assessing
29 impacts to the social and economic environment, the planning team considered the
30 following primary and secondary factors that collectively affect the social and economic
31 environment of the project area.

32 **Factors**

- 33 • Quality of Life in Bay Area
 - 34 ○ NPS public outreach
 - 35 ○ Community-building
 - 36 ○ Health benefits
 - 37 ○ Community value due to surrounding urban growth
- 38 • Population Demographics
 - 39 ○ Population (numbers)
 - 40 ○ People and Households

- 1 ▪ Median age and household size
- 2 ▪ Race
- 3 ▪ Income, poverty, and education
- 4 • Local Economy
- 5 ○ Park's contribution to the economic setting of gateway counties and Bay Area
- 6 ○ Contributions to local economy from visitor expenditures
- 7 ○ Contributions to local economy from NPS management such as employee
- 8 salaries, contracts, and purchases
- 9 ○ NPS support to nonprofit, park partners, and other local agencies
- 10 ○ Tourism attraction that complements San Francisco and Bay Area
- 11 ○ Bay Area commerce and industry trends

12

13 **No Action Alternative**

14 **Analysis**

15 By continuing to provide and potentially expanding open space preservation, outdoor
16 recreation opportunities, natural and cultural resource preservation, interpretation,
17 education, and stewardship opportunities the park would continue to strengthen its
18 contribute to the Bay Area's high quality of life. As detailed in the Social and Economic
19 Affected Environment section, public access to parklands are integral in sustaining a high
20 quality of life in highly urbanized community such as the Bay Area. The Golden Gate
21 National Recreation Area's location at an urban-wildland interface make it particularly
22 important for physiological health (i.e., from exercise), psychological health, community-
23 building, community identity, and landscape aesthetics (e.g., open space backdrop to a
24 densely-populated urban area). As other private land continues to be developed and
25 urbanized into the future, Golden Gate National Recreation Area will become
26 exponentially more valuable to the community and the quality of life of their residents.
27 This would result in an impact that is long-term, moderate, and beneficial in the context
28 of the local gateway communities and three adjacent counties. The impact would be long-
29 term, minor, and beneficial for the overall nine-county Bay Area region.

30 One impact of the no-action alternative on population demographics and quality of life
31 for certain segments of the population relates to how this alternative may not fully
32 address the issues that keep diverse groups from throughout the Bay Area from accessing
33 and enjoying Golden Gate National Recreation Area. The no-action alternative would
34 continue a modest NPS public outreach and orientation program. Although many local
35 residents of the Bay Area may find the existing levels of outreach and orientation
36 adequate, a larger segment of the region's population could benefit from a more
37 concerted and collaborative effort in reaching new audiences and improving public
38 transportation opportunities to the park. As a result, these members of the community
39 may not be aware of or get exposed to what Golden Gate National Recreation Area has to
40 offer. This suggests that a possible gap exists in the NPS's efforts in maximizing the
41 potential quality of life for the Bay Area's diverse population by reaching them or

1 connecting with them. As explained in the Social and Economic Affected Environment
2 section, studies have indicated that several segments of the Bay Area population,
3 primarily racial and ethnic minorities, may feel disconnected from the park. Several
4 explanations such as language barriers, cultural differences, not seeing their race and
5 culture represented by visitors or park staff, were given as contributing factors. Under the
6 no-action alternative, this community disconnection problem may grow over the next 20
7 years since the population of minorities in the Bay Area is expected to grow
8 considerably, possibly to a point of a “minority majority” status in the Bay Area
9 population. As a result, the no-action alternative may result in an impact that would be
10 long-term, minor to moderate, and adverse for the local gateway communities, adjacent
11 counties, and the Bay Area as a whole. The intensity of this impact could become
12 moderate over the next couple decades because: (1) a racial and cultural “disconnect” has
13 already been identified with the existing population demographic, and (2) this disconnect
14 could likely worsen in the future due to the forecasted large increases in Bay Area
15 minority populations (both in number and percentage).

16 With a few exceptions, existing education and stewardship opportunities for the residents
17 would be maintained, and possibly improved as financial and staffing resources become
18 available. These existing programs would continue to contribute to the quality of life for
19 a many residents of the area. This results in an impact that is long-term, minor, and
20 beneficial in the context of the local gateway communities and three adjacent counties.

21 Under the no-action alternative, the National Park Service would continue working
22 cooperatively with other neighboring municipal governments and land managers. With
23 this continuing objective, the NPS actions can further enhance the quality of life by
24 maintaining healthy and productive working relationships with local government
25 agencies and other organizations in the surrounding communities with shared
26 preservation and open space goals. This generally results in community awareness and
27 engagement in park and regional issues. In addition, it typically expands the recreation,
28 education, and stewardship opportunities for residents in the respective communities
29 since these local agencies are more likely to be proactive in providing related services
30 and programs when cooperating with other agencies like the National Park Service. As a
31 result, the impact could be long-term, minor, and beneficial in the context of the local
32 gateway communities and the three adjacent counties.

33 In a general sense, the park’s overall intrinsic contribution to the local economy of the
34 gateway counties and the Bay Area would be maintained and/or enhanced by the no-
35 action alternative. By continuing to provide open space preservation, numerous recreation
36 opportunities, facilities and park settings for organized group activities, the park would
37 continue to help make the Bay Area a place for companies and talented professionals to
38 call home. In other words, the Bay Area’s quality of life becomes a draw for business and
39 economic growth with the help from places like Golden Gate National Recreation Area.
40 The no-action alternative will sustain and enhance this economic value to the Bay Area.
41 The economic growth and success of Silicon Valley is a prime example of how economic
42 growth can feed off of a quality business location and natural landscape backdrop. This
43 results in an impact that would be long-term, moderate, and beneficial in the context of
44 the local gateway communities and three adjacent counties. The impact would be long-
45 term, minor to moderate, and beneficial for the nine-county Bay Area region.

1 In terms of direct effects on the local economy, the no-action alternative would generally
2 maintain the current levels of NPS jobs, concessionaires, NPS operations spending, and
3 contract work, park partners, and with occasional site-specific or program-specific
4 improvements. The value of these attributes to the local economy is discussed in the
5 “Social and Economic Environment” section of Part 8. The overall value of the park’s
6 contribution to the local economy would continue to have significant positive effects on
7 the local economy in the gateway communities and three adjacent counties. In addition,
8 Alcatraz Island remains a major attraction that directly contributes to the tourism industry
9 through increase length of stay in local accommodations, business opportunities related to
10 Alcatraz theme, Bay tours, and other guided commercial opportunities. These
11 commercial activities contribute to sustaining employment within the tourism industry.
12 The continuation of the current management direction would have a long-term, minor to
13 moderate beneficial impacts on the gateway communities and adjacent three counties.

14 **Conclusion**

15 The overall impact to the social and economic environment from the no-action alternative
16 could be long-term, minor to moderate, and beneficial for the local gateway communities
17 and the three adjacent counties. The beneficial impacts would result from maintaining the
18 park’s contribution to the local economy and quality of life, existing education and
19 stewardship programs, as well as maintaining existing relationships with other local
20 governments and land managers. However, the no-action alternative may not fully
21 address the issues that keep diverse demographic groups from throughout the Bay Area
22 from accessing and enjoying Golden Gate National Recreation Area. This results in an
23 impact that could be long-term, minor to moderate, and adverse for the local gateway
24 communities, adjacent counties, and the Bay Area as a whole.

25

26 **Alternative 1: Connecting People with the Parks**

27 (NPS Preferred Alternative for park sites in Marin, San Francisco, and San Mateo
28 counties)

29 **Analysis**

30 In alternative 1, the park staff would make stronger efforts at reaching out to the diverse
31 populations of the Bay Area and welcoming them to Golden Gate National Recreation
32 Area. Actions would include community outreach programs, adding group facilities, new
33 park programs, and establishing new welcome/orientation facilities in key locations in the
34 park. These outreach and welcoming efforts would include collaborative community
35 building and would help foster a new relationship with Bay Area residents. A community
36 that develops a strong relationship with its parks can contribute to quality of life. Under
37 alternative 1, new and/or improved welcoming and orientation centers would be provided
38 at locations such as Marin Headlands in Marin County, Upper Fort Mason in San
39 Francisco, and an interagency visitor center in Pacifica and a center located near Montara
40 Lighthouse. A stronger National Park identity and message would welcome and help
41 orient visitors to available opportunities. Improved and expanded visitor facilities would
42 accommodate the needs of different user groups and contribute to the expanded efforts to
43 reach out to new audiences. Interpretive and educational programs would evolve to better

1 connect diverse communities with the park's resources. These actions would contribute to
2 the quality of life for Bay Area residents. This could result in an impact that is long-term,
3 minor to moderate, and beneficial to the local gateway communities and three adjacent
4 counties. The impact to the overall Bay Area could be long-term, minor, and beneficial.

5 The NPS would also increase stewardship opportunities for local residents by improving
6 facilities and enhancing programs at park sites throughout the three gateway counties.
7 These facility and program enhancements under alternative 1 would provide new
8 educational and stewardship opportunities for many school groups, residents, and
9 visitors, within Marin, San Francisco, and San Mateo counties, and throughout the Bay
10 Area. These existing and expanded opportunities could facilitate local residents and
11 visitors in learning about the park's resources, and in making personal connections to and
12 enjoyment of the park. Existing and expanded education and stewardship programs under
13 alternative 1 would occur at Slide Ranch, Lower Redwood Creek, Tennessee Valley, and
14 the Marin Headlands in Marin County; Upper Fort Mason and Fort Miley in San
15 Francisco; and Shelldance Nursery area, Phleger Estate, and Rancho Corral de Tierra in
16 San Mateo County. All of these possible enhancements could contribute to an improved
17 quality of life for local, involved residents and families. In addition, this action may also
18 create new opportunities for park partners to carry out their community programs at these
19 park sites. The impacts from these educational and stewardship opportunities could be
20 long-term, minor to moderate, and beneficial for the local gateway communities and the
21 three adjacent counties.

22 Under alternative 1, the National Park Service would work closely with local
23 communities to improve accessibility to Golden Gate National Recreation Area by: (1)
24 developing new public transit stops at certain park sites (e.g., at Golden Gate Dairy,
25 Tennessee Valley, and Fort Mason's connection to the anticipated extension of the
26 historic San Francisco street car system and water shuttle development); and (2) making
27 strong efforts to establish connections to existing trail systems, parks, and communities
28 throughout all three gateway counties. In addition to providing additional trail recreation
29 options, this accessibility improvement should provide community residents new
30 opportunities to access the park and benefit from park programs and amenities. In turn,
31 these actions can contribute to improving the quality of life for the local residents taking
32 advantage of the access points, by getting exercise, learning, and recreating in the park.
33 Some examples of these alternative 1 trail connection efforts would be in the Marin
34 Headlands area, Fort Miley, Lands End, Ocean Beach, Milagra Ridge area, Sweeney
35 Ridge area, Mori Point, San Pedro Mountain area, Rancho Corral de Tierra, Phleger
36 Estate and the SFPUC Watershed Easement lands. All of these park accessibility
37 improvements (whether via public transit or trails) would provide more opportunities for
38 community residents and visitors to access and enjoy Golden Gate National Recreation
39 Area, and in turn, enhance the quality of life for the surrounding communities. This
40 accessibility outreach could be particularly valuable to individuals from lower income
41 brackets by providing more, affordable ways to reach the park. These actions could result
42 in an impact is long-term, minor to moderate, and beneficial for the local gateway
43 communities and the three adjacent counties.

44 With the exception of the relocation of one small equestrian facility in Marin County
45 (relocating the facility at the Golden Gate Dairy to the Lower Redwood Creek area),

1 alternative 1 would support the continuation of all other existing equestrian facilities in
2 the park. Some minor expansions may also take place at the facility in Tennessee Valley,
3 while the existing equestrian facilities at Picardo Ranch and Rancho Corral de Tierra in
4 San Mateo County will be maintained under alternative 1. These facilities are important
5 recreational assets to many members of the surrounding communities and contribute to
6 the quality of life of these residents. The community value of these facilities will only
7 increase over time as other private equestrian facilities (outside the park) are closed or
8 displaced by urban development. Sustaining and/or expanding these equestrian facilities
9 could yield impacts that are long-term, minor to moderate and beneficial for the local
10 gateway communities and the three adjacent counties, while being negligible for the
11 overall Bay Area. Conversely, the removal and relocation of the small equestrian facility
12 at Golden Gate Dairy may have a negative effect on some residents, which may result in
13 an impact that is long-term, minor, and adverse in the context of local gateway
14 communities. However, this relocation would have a negligible effect on the three
15 adjacent counties.

16 Alternative 1 includes a variety of actions that would help foster or improve relationships
17 between the National Park Service and local communities, park partners, and other
18 adjacent land management agencies. These actions would include community outreach
19 and education programs that help introduce the community to the national park system.
20 Alternative 1 places an emphasis on preserving and enhancing opportunities for local
21 community residents to experience nature, learn local history, and enjoy open lands with
22 other community residents. By providing opportunities and a venue for community
23 interaction, this would enhance the quality of life for residents of the gateway counties.
24 This alternative would also emphasize building community connections by collaborating
25 with local governments, park partners, and other local land managers via multi-agency
26 projects. This type of public outreach and inter-agency collaboration would help build a
27 seamless network of public lands as well as an educated and informal local public. The
28 resulting recreational and educational opportunities for the residents of the area could
29 inherently improve the overall community's quality of life. Some examples of this from
30 alternative 1 are as follows: (1) two new multi-agency visitor information and orientation
31 facilities that could increase community awareness about the many interconnected public
32 lands (and management of these lands) throughout San Mateo County; (2) land
33 acquisition and resource management in coordination with regional organizations and
34 land management agencies in Marin, San Francisco, and San Mateo counties; (3) the use
35 of the historic park structures at the Golden Gate Dairy, Upper Fort Mason, and Fort
36 Miley to support the operation of community services and other park partners.
37 Community-building efforts such as these could result in impacts that are long-term,
38 moderate, and beneficial for local gateway communities. Impacts to the three adjacent
39 counties could be long-term, minor to moderate, and beneficial. In the context of the Bay
40 Area, the impacts could be negligible to long-term, minor, and beneficial.

41 The impact of alternative 1 actions on population growth, median age, racial distribution,
42 median income levels, poverty levels, and education levels, would be negligible at a local
43 and regional level. However, the strong component of community outreach, welcoming,
44 and orientation under alternative 1 could have a positive influence in engaging racial
45 minorities and lower income brackets of the population. As described in the Affected
46 Environment (Visitor Experience and Social and Economic sections), the Bay Area

1 consists of a very diverse population of many races and cultures. In addition, many of the
2 racial and ethnic groups in the Bay Area do not feel connected with Golden Gate
3 National Recreation Area for several reasons (e.g., language barriers, not seeing their race
4 and culture represented by visitors or park staff). This issue could be compounded by the
5 substantial population increase of these minority groups that is projected over the next 20
6 years. The actions included in “alternative 1: Connecting People with the Parks” could
7 help the National Park Service build a connection and relationship with these segments of
8 the Bay Area population, by reaching out and welcoming them to the park, as well as
9 providing clear visitation information for them. This may result in more racial and ethnic
10 groups in the Bay Area visiting Golden Gate National Recreation Area, and being more
11 active and engaged in park issues. The impact of alternative 1 on the population
12 demographic could be long-term, minor to moderate, and beneficial, that affects a
13 geographic range from the local gateway communities to the nine-county Bay Area.

14 A key component of alternative 1 is providing new and upgraded visitor facilities that
15 would complement the park staff’s efforts at welcoming and orienting people to the park.
16 Given this priority, alternative 1 would include many new and expanded facilities
17 throughout the park in all three gateway counties. The projects would include the
18 construction, relocation, redevelopment, and/or restoration of visitor centers, historic
19 structures, restrooms, showers, picnic areas, parking lots, warming huts, interpretive
20 exhibits, roadway viewpoints, campsites, trailheads, and other modest overnight
21 accommodations. Alcatraz Island would also have numerous historic structure restoration
22 projects. Many of these projects would generate new work for local and regional
23 companies in the Bay Area, including engineering consultants, construction contractors,
24 and environmental consultants. These projects would not only support these businesses
25 and their employees directly, but the economic multiplier effect would circulate this
26 contract money through the local economy. The collective result of these actions would
27 be an economic contribution that is short-term, minor to moderate, and beneficial for
28 local gateway communities and three adjacent counties.

29 In addition to the economic contributions as described in the no-action alternative,
30 Alternative 1 would also create new and expanded opportunities for some park partners,
31 local agencies, and organizations by providing expanded visitor programs and amenities.
32 For example, the park facilities in and around Fort Cronkhite and Fort Barry area in
33 Marin County would be made available to park partners to provide more educational,
34 stewardship programming, and visitor services opportunities. Another example exists at
35 Fort Mason, where the visitor facilities, services, and opportunities would be developed
36 in conjunction with additional visitor use of historic structures, the extension of the
37 historic San Francisco street car system, access to a water shuttle, and a potential
38 embarkation point to Alcatraz Island. This consideration would foster improved
39 collaboration with the City and County of San Francisco, the San Francisco Maritime
40 National Historical Park, as well as other local partners. In turn, expected increased in
41 park visitation would contribute to the success of the educational and economic activities
42 at Fort Mason Center. These types of collaborations with park partners and other local
43 agencies would result in an impact that is long-term, minor to moderate, and beneficial
44 for local gateway communities and the three adjacent counties.

1 As noted above, alternative 1 includes actions that would increase efforts to reach out to
2 new and diverse segments of the Bay Area populace as well as provide new visitor
3 opportunities and services. And, given the growing population at the doorstep of Golden
4 Gate National Recreation Area, these actions will likely yield an increase in annual park
5 visitation over the next 20 years. As the visitation to the park increases, several direct and
6 indirect economic benefits would result. The park could see an increase in revenue,
7 which may fund future park improvement work, local contracts with area-wide business,
8 and expanded programs by park partners. This funding would also have an economic
9 multiplier effect on the local economy as income circulates throughout the gateway
10 communities. In addition, as more visitors travel to the park sites throughout the gateway
11 counties, they would spend money at the many local businesses and concessionaires in
12 and around the park sites (e.g., eateries, hotels, services, etc.). This increased revenue
13 would directly support the local businesses and their employees directly. In addition, this
14 money would eventually circulate further through the Bay Area economy due to the
15 multiplier effect and possibly lead to more economic growth in the gateway communities
16 (as additional revenue monies move through the local economy). This money inflow into
17 the local economy would result in an impact that is long-term, moderate, and beneficial
18 for local gateway communities. Impacts to the three adjacent counties would be long-
19 term, minor to moderate, and beneficial. In the context of the Bay Area, the impacts
20 would be negligible to long-term, minor, and beneficial.

21 Lastly, to meet the “Connecting People with the Parks” objective of alternative 1, several
22 park facilities and amenities would be upgraded to provide more guest services to better-
23 accommodate the visitors. These improved services would include: visitor orientation,
24 food services, meeting/program space, rustic cabins, hostels, camping, and special event
25 or conference hosting. These new or expanded services could generate additional
26 employment for park partners, concessionaires, and local businesses. Under alternative 1,
27 these visitor service improvements would occur in all three gateway counties. Some
28 examples of these improvements would be at Upper Fort Mason and Fort Funston in San
29 Francisco, Alcatraz Island, the Fort Cronkhite and Fort Barry area of Marin County, and
30 Montara Lighthouse in San Mateo County. The creation of jobs is important for
31 economic growth, as it provides sustained direct and secondary spending (i.e., economic
32 multiplier effect) in local spending in the community. Thus, these proposed visitor
33 services in alternative 1 would have an impact that is long-term, minor, and beneficial in
34 the context of the local gateway communities and three adjacent counties.

35 **Conclusion**

36 The short-term and long-term beneficial impacts of alternative 1 on the social and
37 economic environment of the local gateway communities, the three adjacent counties,
38 and the Bay Area could range from minor to moderate. These beneficial impacts would
39 result from: (1) a significant increase in public outreach programs, visitor orientation and
40 educational/stewardship opportunities, (2) the NPS making stronger attempts at reaching
41 out to and connecting with the diverse population of the Bay Area (including racial
42 minorities and individuals from lower income brackets) (3) significant improvements in
43 public accessibility, transportation options, and community trail connections, (4)
44 sustaining and/or enhancing the existing equestrian facilities, (5) incorporating several
45 community-building components, (6) a significant amount of new engineering and

1 construction contract work for numerous facility improvement projects throughout the
2 three gateway counties, (7) several new opportunities for park partners to use park
3 facilities and expand their operations, (8) increased park revenues and increased spending
4 at local businesses from an anticipated increase in park visitation due to active public
5 outreach and welcoming efforts, and (9) a substantial amount of job creation from the
6 proposed increase in visitor services throughout the park. The only negative effect of
7 alternative 1 would be the removal and relocation of a relatively small equestrian facility
8 in Marin County, which could result in a long-term, minor, and adverse impact to the
9 local gateway communities.

10

11 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

12 ***Analysis***

13 As described in the no action alternative analysis section, several segments of the Bay
14 Area population, primarily racial and ethnic minorities, may feel disconnected from the
15 park due to issues such as language barriers, cultural differences, not seeing their race and
16 culture represented by visitors or park staff. Alternative 2 may not fully address this issue
17 since the alternative is more focused on more preserving the wild conditions of the park
18 and thereby limiting visitor opportunities that may appeal to a more diverse group of
19 visitors.

20 Under alternative 2, this community disconnection problem may grow over the next 20
21 years since the population of minorities in the Bay Area is expected to grow
22 considerably, possibly to a point of a “minority majority” status in the Bay Area
23 population. As a result, this alternative may result in an impact that would be long-term,
24 minor to moderate, and adverse for the local gateway communities, adjacent counties,
25 and the Bay Area as a whole.

26 One of the key priorities of “alternative 2 : Preserving and Enjoying Coastal Ecosystems”
27 is educating the public on the importance of the natural resource throughout the Bay Area
28 coast environment and the importance of being good stewards to these unique resources.
29 Under alternative 2, the NPS would increase educational and stewardship opportunities
30 for local residents and school groups in the three gateway counties by improving facilities
31 and enhancing education and stewardship programs at several Golden Gate National
32 Recreation Area park sites throughout the region. Raising the level of community
33 awareness of ecological issues and active stewardship can directly and indirectly
34 contribute to the quality of life for residents of the area. In terms of direct effects, the
35 education programs could help residents become more concerned and “invested” in the
36 park and its unique resources, which could yield a stronger sense of community value and
37 healthy living. As for indirect effects, the open lands and unique resources would stand a
38 better chance at being preserved into the future if the community residents become more
39 aware and active in stewardship. In other words, by helping to preserve the resources, the
40 residents are, in effect, also helping to preserve the qualities that make living the Bay
41 Area wonderful (since much of their quality of life relies on the open, preserved lands
42 and resources around them). Under alternative 2, these types of education and
43 stewardship program enhancement would occur at the Golden Gate Dairy in Marin

1 County, Fort Miley and Fort Mason in San Francisco, and Picardo Ranch, and Rancho
2 Corral de Tierra, and Montara Lighthouse in San Mateo County. In addition, Montara
3 Lighthouse would be dedicated as a formal site for educational and stewardship
4 programs. All of these possible enhancements would contribute to the quality of life for
5 many visitors and local residents and families. In addition, this action may also create
6 new opportunities for park partners to carry out their community programs at these park
7 sites. The impacts from these educational and stewardship actions could be long-term,
8 minor to moderate, and beneficial for the local gateway communities and the three
9 adjacent counties.

10 However, under alternative 2, converting Montara Lighthouse from a hostel to a facility
11 dedicated to education and stewardship would have a long-term, minor, adverse impact to
12 the hostel facility operators. In addition, the environmental education center and the farm
13 education center at Slide Ranch would be relocated to a more sustainable and
14 geologically stable area. Although the education programs would be continued in the new
15 location, the quality of the natural experience for residents and school children may be
16 negatively affected due to the location change, especially if relocated away from the
17 Pacific Ocean. This action may result in an impact that is long-term, minor, and adverse
18 in the context of the local gateway communities. The impact in the context of the three
19 adjacent counties would be negligible.

20 In terms of community connectivity, the NPS would work with local communities and
21 land managers to pursue improved accessibility to some park sites by establishing
22 connections to various existing trail systems, parks, and communities in all three gateway
23 counties. These trail connections should provide community residents with new ways to
24 access Golden Gate National Recreation Area and benefit from park programs and
25 amenities, as well as providing residents with additional trail recreation opportunities. In
26 turn, this should contribute to the quality of life for the local residents taking advantage of
27 the access points, by getting exercise, learning, and recreating in the park. Some
28 examples of these alternative 2 trail connection efforts would be in the Marin Headlands
29 area, Fort Miley, Milagra Ridge area, Sweeney Ridge area, San Pedro Mountain area, and
30 Rancho Corral de Tierra. In addition to trail connections, alternative 2 would include a
31 connection of Fort Mason to the anticipated extension of the historic San Francisco street
32 car system and water shuttle development. All of these park accessibility improvements
33 (whether via public transit or public trails) would provide more opportunities for
34 community residents to visit the park, and in turn, could enhance the quality of life for the
35 surrounding communities. These actions could result in an impact is long-term, minor to
36 moderate, and beneficial for the local gateway communities. Impacts to the three adjacent
37 counties could be long-term, minor, and beneficial.

38 As for equestrian facilities, under alternative 2, the equestrian facilities in Marin County
39 would be more or less maintained as is, with the possible exception of more limited trail
40 use due to the ecological protection objective of this alternative. However, the four
41 equestrian facilities at Rancho Corral de Tierra in San Mateo County could be removed
42 and/or relocated in an effort to protect resources near the streams. These facilities are
43 important recreational assets to many members of the surrounding communities in San
44 Mateo County and beyond and significantly contribute to their quality of life. The
45 community value of these facilities would only increase over time as other equestrian

1 facilities outside the park are closed or displaced by urban development. Therefore, if
2 removed, the four equestrian facilities at Rancho Corral de Tierra could result in a long-
3 term, minor to major, and adverse impact in the context of the local gateway communities
4 and three adjacent counties.

5 Alternative 2 includes several actions that would help the NPS develop relationships with
6 local communities and local land management agencies of the Bay Area. Many of these
7 actions are focused on cooperating with other land managers to jointly solve and address
8 long-term natural resource issues. Other actions are aimed at creating relationships with
9 gateway county communities to establish a network of natural resource stewardship
10 programs in Golden Gate National Recreation Area. Thus, these actions are in line with
11 alternative 2's dual emphasis of protecting the ecological resources and educating the
12 community on these resources (and how to be good stewards). In addition to generating
13 support and sustained stewardship for the lands and resources, all of these actions would
14 also contribute to community-building in the area. When a diverse population of residents
15 and agencies work together toward a common goal, such as the effective stewardship of
16 park lands and resources, an evolving sense of environmental ethic and community
17 livability develops. This further contributes to the community's quality of life. Some
18 example actions from alternative 2 would be as follows: (1) NPS collaboration with local
19 communities and several park partners to promote awareness of climate change and the
20 coastal resource preservation (and the interconnectedness between the two); (2) use of
21 Fort Mason as a hub for volunteering, stewardship, and education programs; and (3) NPS
22 cooperation with several local land management agencies in San Mateo County to protect
23 and manage natural resources across park/jurisdiction boundaries. Community-building
24 actions like these can result in impacts that are long-term, moderate, and beneficial for
25 local gateway communities. Impacts to the three adjacent counties could be long-term,
26 minor to moderate, and beneficial. In the context of the Bay Area, the impacts could be
27 negligible to long-term, minor, and beneficial.

28 Since alternative 2 focuses more on the preservation and restoration of coastal
29 ecosystems and substantially more efforts are directed to restoration projects that
30 rehabilitate disturbed natural settings and to reestablish connecting habitat corridors.
31 Under alternative 2 the natural resources restoration would contribute to the local
32 economy in the three gateway counties, and possibly beyond. The projects would include
33 restoration of habitats, stream corridors, marine ecosystems, and removal of invasive
34 species over large areas of the park. In addition, alternative 2 would improve some park
35 facilities and infrastructures in order to continue these visitor services while working to
36 minimize impacts on the natural resources of the park. Many of these projects would
37 generate new work for local and regional companies in the Bay Area, including
38 engineering consultants, construction contractors, and environmental consultants. These
39 projects would not only support these businesses and their employees directly, but the
40 economic multiplier effect would circulate this contract money through the local
41 economy. These actions could result in impacts that are short-term, minor, and beneficial
42 for local gateway communities and three adjacent counties.

43 Alternative 2 would have some beneficial impacts on the park partners and other
44 community organizations in the area. The most notable new impacts on park partners
45 under alternative 2 would be at Alcatraz Island and in the City and County of San

1 Francisco. At Alcatraz Island, the proposed expanded ecotourism, outdoor education, and
2 stewardship programs that emphasize on the Island's isolation, natural resources, and
3 history would partner with and support Bay Area agencies. And, in San Francisco, the
4 NPS at Fort Mason would become a stewardship hub that would place a high priority on
5 collaborating with local communities and several park partners to promote and address
6 climate change and preservation of the coastal natural resources. This would strengthen
7 working relationships with the communities, support the growth of park partner
8 organizations, as well as raise community awareness of climate change. These actions
9 could result in impacts that are long-term, minor, and beneficial for local gateway
10 communities and three adjacent counties.

11 The removal of the facilities at Slide Ranch would negatively affect the park partner that
12 currently manages Slide Ranch. Also, alternative 2 would include the removal of work
13 force housing units at Capehart Housing Area in Marin County to allow for ecological
14 restoration. This would affect park partners who utilize these facilities. The above two
15 impacts to the local economy would be long-term, minor and adverse in the context of the
16 local gateway communities. Impacts to the three adjacent counties would be negligible.

17 Park visitation would continue to increase with the added improvements to the park's
18 trail system and service expansions at Fort Mason and Montara Lighthouse in San Mateo
19 County. These actions would increase visitation by local residents. However, overall this
20 alternative does not appreciably add new levels of visitor services and facilities and
21 emphasizes a more primitive visitor experience. The above actions would result in
22 negligible increase in park-related employment opportunities and could limit the amount
23 of new visitation, especially from regional and national visitors. Therefore, alternative 2
24 could have a minimal added contribution to the local economy resulting in long-term,
25 minor, beneficial impact to the gateway communities and negligible impacts to the three
26 counties adjacent counties.

27 Alternative 2 includes a proposal that, in event of catastrophic coastal landslide on U.S.
28 Highway 1 (south of Stinson Beach) in Marin County, NPS would recommend to
29 Caltrans abandoning this section of road. If this would occur, the closure of U.S.
30 Highway 1 would alter the transportation system for local communities (and regionally,
31 for Caltrans), which would be inconvenient to local residents. This closure could have an
32 impact that is long-term, moderate, and adverse to the local gateway communities.
33 Impacts to the three adjacent counties and the Bay Area could be long-term, minor, and
34 adverse.

35 On Alcatraz Island, alternative 2 would include visitor orientation, some food services,
36 office/classroom space, day use programming facilities, and hostel accommodations.
37 These new and expanded services could generate additional jobs for NPS employees
38 and/or private concessionaires and result in long-term, minor, beneficial impacts to the
39 local gateway communities and negligible impacts to the three adjacent counties.

40 **Conclusion**

41 In summary, the short-term and long-term beneficial impacts of alternative 2 on the local
42 gateway communities and the three adjacent counties would range from minor to
43 moderate. In the context of the overall Bay Area, the beneficial impacts would be minor.
44 Collectively, the beneficial impacts could result from (1) some site-specific increase in

1 public outreach programs and visitor orientation, (2) a significant increase in educational
2 and stewardship opportunities, (3) some additional community trail connections, (4) NPS
3 collaborations with several other community governments and land management
4 agencies, (5) some new engineering and construction contract work for numerous facility
5 improvement projects throughout the three gateway counties, (6) a limited number of
6 new park partners opportunities, (7) a limited increase in park revenues and spending at
7 local businesses from a modest increase in park visitation due to public outreach and
8 welcoming efforts, and (8) a limited amount of job creation from the proposed increase in
9 visitor services throughout the park.

10 The long-term adverse impacts to the social and economic conditions of the local
11 gateway communities, three adjacent counties, and the Bay Area could range from minor
12 to moderate. The adverse impacts from alternative 2 could result from (1) not fully
13 addressing the issues that keep some diverse population groups in the Bay Area from
14 visiting and enjoying the park, (2) a possible reduction in NPS and concessionaire jobs at
15 certain park sites due to area closures, (3) a possible reduction in the amount of
16 opportunities for park partners, (4) the recommended closure of U.S. Highway 1, and (5)
17 removing or relocating large equestrian facilities (at Rancho Corral de Tierra) and an
18 environmental and agricultural education facility (at Slide Ranch).

19

20 **Alternative 3: Focusing on National Treasures (the NPS Preferred** 21 **Alternative for Alcatraz Island)**

22 ***Analysis***

23 Public outreach, welcoming, and orientation is an important component of alternative 3.
24 Under alternative 3, several park site facilities and services will be expanded and/or
25 enhanced in a way that offers improved information and orientation to the NPS and to
26 Golden Gate National Recreation Area for the large, diverse population of the Bay Area
27 communities. The proposed visitor welcoming centers at Capehart Housing Area in
28 Marin County, Upper Fort Mason in San Francisco, and Sheldance Nursery in San
29 Mateo County are three good examples of this outreach effort. By providing these
30 enhanced orientation services and an understanding of park related opportunities to the
31 diverse populations via new facilities and programs, the NPS could improve the quality
32 of life for many Bay Area residents under alternative 3. This could result in an impact
33 that is long-term, minor to moderate, and beneficial in the context of the local gateway
34 communities and three adjacent counties. The impact to the overall Bay Area could range
35 from negligible to long-term, minor, and beneficial.

36 The educational and stewardship opportunities provided in alternative 3 are substantially
37 more than what is currently provided in the no-action alternative. Alternative 3 focuses
38 on education and stewardship of both ecological education and historic and cultural sites.
39 Under alternative 3, the NPS would increase educational and stewardship opportunities
40 for local residents and school groups in the three gateway counties by improving both
41 facilities and education and stewardship programs at many park sites. By educating the
42 local residents about the ecological and historic significance and national uniqueness of
43 the many cultural sites around them, the NPS can generate community interest in

1 resource stewardship of these sites, as well as provide the residents with a comprehensive
2 understanding of the Bay Area history. Both of these results contribute to an improved
3 quality of life for residents of the area. Some examples of alternative 3 education and
4 stewardship program expansions are the improved facilities and enhanced education
5 programs throughout Marin and San Francisco counties and the enhanced stewardship
6 programs at Rancho Corral de Tierra and Montara Lighthouse in San Mateo County. The
7 impacts from these actions could be long-term, minor to moderate, and beneficial for the
8 local gateway communities and the three adjacent counties.

9 Under alternative 3, the NPS would attempt to establish a park-wide expansion of trail
10 connections to adjacent community parks and trail networks. This effort would
11 necessitate close collaboration with many local land managers and local governments in
12 all three gateway counties. These trail connections should provide community residents
13 with several additional ways to access Golden Gate National Recreation Area park sites
14 to benefit from park programs and amenities, as well as providing residents with new trail
15 recreation opportunities. This increase in park/trail recreation opportunities could
16 improve the quality of life for the local residents, by making it easier for them to get
17 exercise, learn about park resources, and recreate with others from the community. In
18 alternative 3, trail connection efforts would be located at the Marin Headlands area,
19 Lands End, Fort Miley, Milagra Ridge area, Sweeney Ridge area, Mori Point, San Pedro
20 Mountain area, Rancho Corral de Tierra, Phleger Estate, and the SFPUC Watershed
21 Easement lands. All of these park accessibility improvements could provide new
22 opportunities for community residents to visit the park, and in turn, enhance their quality
23 of life. These actions could result in an impact is long-term, minor to moderate, and
24 beneficial for the local gateway communities and the three adjacent counties.

25 Also, all existing equestrian facilities in the park would be either maintained as the are or
26 enhanced. More specifically, the facilities at Rancho Corral de Tierra and Picardo Ranch
27 in San Mateo County would continue to accommodate the equestrian uses that have
28 become very important to some members of the local community. And, in Marin County,
29 the equestrian facility at the Golden Gate Dairy would be expanded by making use of the
30 historic structures at the site for equestrian use (among other possible recreational uses).
31 If this happens, the Muir Beach Volunteer Fire Department (currently using the
32 structures) may be negatively affected by the added visitor use at this site. These
33 equestrian facilities in the park are important recreational assets to many members of the
34 surrounding communities and contribute to the quality of life of these residents. The
35 community value of these facilities will only increase over time as other private
36 equestrian facilities (outside the park) are closed or displaced by urban development.
37 Therefore, the maintenance or enhancement of the existing equestrian facilities could
38 yield impacts that are long-term, minor, and beneficial for the local gateway communities
39 and the three adjacent counties.

40 Similar to the no-action alternative, alternative 3 includes several actions that would help
41 the NPS develop relationships with local communities and local land management
42 agencies of the Bay Area. Alternative 3 aims at cooperation with other local communities
43 and land managers as a way to educate the Bay Area community on the national
44 significance and uniqueness of the many park sites (both in the park and on other public
45 lands in the area). This heightened public awareness of the history and national

1 significance of the many park sites in all three gateway counties would likely generate a
2 sense of community pride throughout the area. The alternative 3 actions in San Mateo
3 County provide a good example of this effort to generate community interest and
4 engagement in the unique cultural sites and preserved lands in the area. With
5 alternative 3, the National Park Service would pursue increased collaboration with other
6 land managers in area to educate the local communities on how the “quilt” of
7 undeveloped land has been preserved by the NPS, various land trusts, several local
8 governments, and individuals. In addition to engaging park partners and local
9 communities in park issues, this would generate a sense of community pride for residents
10 in the region. Understanding and awareness of a resource can lead to community
11 appreciation, awareness, and pride. These community values can contribute to the quality
12 of life in the area. These community-building actions of alternative 3 could result in
13 impacts that are long-term, moderate, and beneficial for local gateway communities.
14 Impacts to the three adjacent counties could be long-term, minor to moderate, and
15 beneficial. For the nine-county Bay Area, the impacts could be negligible to long-term,
16 minor, and beneficial.

17 In terms of impacts to the local economy, alternative 3 would include major construction
18 and restoration projects at park sites throughout all three gateway counties and on
19 Alcatraz Island. The projects under alternative 3 would include the construction,
20 relocation, redevelopment, and/or restoration of visitor centers, a stewardship/education
21 center, several historic structures, restrooms, showers, picnic areas, parking lots, warming
22 huts, interpretive exhibits, roadway pull-offs, rustic overnight accommodations, and
23 natural landscapes. Many of these projects would generate new contract work for private
24 firms in the Bay Area, including engineering consultants, construction contractors, and
25 environmental consultants. These projects would not only support these contracting
26 businesses and their employees directly, but the economic multiplier effect would
27 circulate this contract money through the local economy. This phenomenon is explained
28 in the Social and Economic Affected Environment section. The collective result of these
29 contracted projects would be impacts that are short-term, minor to moderate, and
30 beneficial for local gateway communities and three adjacent counties.

31 The proposed expansion of facilities and services at Alcatraz Island and other historic
32 park sites would be some examples where park partners and concessionaires would
33 benefit by NPS programming. And, at Fort Mason in San Francisco, where the visitor
34 facilities would be developed in conjunction with the extension of the historic San
35 Francisco street car system and development of a water shuttle access. In turn, increased
36 park visitation resulting from these new opportunities would help support and contribute
37 positively to programs and operations of our park partners. This collaboration with park
38 partners and other local organizations and agencies would result in impacts that are long-
39 term, minor to moderate, and beneficial for local gateway communities and the three
40 adjacent counties.

41 Alternative 3 would include the removal of work force housing units at Capehart Housing
42 Area in Marin County. These units would be replaced with a new visitor center. This
43 could affect park partners who operate out of this facility. This could result in an impact
44 that is long-term, minor, and adverse in the context of local gateway communities.
45 Impacts to the three adjacent counties would be negligible.

1 Alternative 3 would include a new visitor opportunities and community outreach
2 component with strengthened welcoming and orientation services and expanded park
3 programs. For example, Upper Fort Mason would have expanded visitor welcoming
4 amenities and would be utilized as a “portal” for visitor orientation to other park sites.
5 Welcoming efforts such as this may generate increased visitation at some parks sites of
6 Golden Gate National Recreation Area. Throughout the park and on Alcatraz Island, the
7 emphasis on historical interpretation, immersion, and programming may also result in
8 increased visitation. When the visitation at park sites increase, several direct and indirect
9 economic benefits could result. First, the park would see an increase in revenue, which
10 may fund future park improvement work and contracts, which will have multiplier effects
11 on the local economy. Secondly, as more visitors travel to the park sites throughout the
12 gateway counties, they would spend money at the many local businesses and
13 concessionaires in and around the park sites (e.g., eateries, hotels, services, etc.). This
14 increased revenue would directly support the local businesses and their employees
15 directly. In addition, this money would eventually circulate further through the Bay Area
16 economy due to the multiplier effect and possibly lead to more economic growth in the
17 gateway communities (as additional revenue monies move through the local economy).
18 This money inflow into the local economy from alternative 3 would result in an impact
19 that is long-term, minor, and beneficial for the local gateway communities and three
20 adjacent counties.

21 To fulfill the “Focusing on National Treasures” objective of alternative 3, park facilities
22 and amenities would be restored and new park programs developed. These new or
23 expanded services could generate additional jobs for NPS employees and/or private
24 concessionaires. These improved services would include: a new ferry service (Fort
25 Mason to Alcatraz Island), improved visitor orientation and additional park programs,
26 facilities and services and special event hosting. The creation of jobs is important for
27 economic growth, as it provides sustained direct and secondary spending (i.e., multiplier
28 effect) in local spending in the community. Thus, these proposed service expansion
29 actions in alternative 3 would have an impact that is long-term, minor, and beneficial in
30 the context of the local gateway communities. The impact in the context of the three
31 adjacent counties would be negligible.

32 However, a possible negative impact to tour boat operators may occur with alternative 3.
33 Although the visitor ferry access will be accommodated along the eastern shoreline, the
34 historic no trespass zone around the Island will place limitations on tour boat operators
35 that can use the area/site, thus negatively affecting jobs and reducing economic multiplier
36 effect of this tourism industry. This impact would be long-term, minor, and adverse to the
37 local gateway communities.

38 **Conclusion**

39 The short-term and long-term beneficial impacts of alternative 3 on the social and
40 economic environment of the local gateway communities, the three adjacent counties
41 could range from minor to moderate. And, the impacts to the overall Bay Area would
42 range from negligible to long-term, minor, and beneficial. The beneficial impacts could
43 result from: (1) an increase in public outreach programs, visitor orientation,
44 educational/stewardship opportunities and additional park programs, (2) notable
45 improvements in public accessibility and community trail connections, (3) sustaining

1 and/or enhancing all existing equestrian facilities, (4) incorporating several community-
2 building components, (5) a moderate amount of new engineering and construction
3 contract work for numerous facility improvement and restoration projects throughout the
4 three gateway counties, (6) limited new opportunities for park partners to use park
5 facilities and expand their operations, (7) a modest increase in park revenues and
6 increased spending at local businesses from an anticipated increase in park visitation due
7 to public outreach and welcoming efforts, and (8) a small amount of job creation from
8 the proposed increase in visitor services throughout the park.

9 The adverse impacts could result from removal of work force housing units at Capehart
10 Housing Area and possible restrictions on tour boat operators with implementing the
11 historic no trespass zone around the Island. These impacts would be long-term, minor,
12 and adverse to the local gateway communities.

13

14 **TRANSPORTATION**

15 This section describes the potential impacts to transportation at Golden Gate National
16 Recreation Area, including Alcatraz Island. The impacts are described for the counties of
17 Marin, San Francisco, and San Mateo, and for Alcatraz Island.

18

19 **No Action Alternative**

20 ***Analysis***

21 ***Marin County***

22 In general, park areas in Marin have good pedestrian access, with some transit access to
23 the Headlands from San Francisco, and transit to other park sites via the West Marin
24 Stagecoach and the Muir Woods Shuttle. Traffic congestion is a current and worsening
25 problem in specific areas as noted below. In many cases traffic congestion is related to
26 the rural roadway system with limited options and limited capacity. In rural Marin
27 County, roadway access is unlikely to increase substantially.

28 In the southeast coastal area (*Rodeo Valley / McCullough and Conzelman Road*), existing
29 planned road, trail, and transit projects are likely to improve access for visitors from all
30 parts of the Bay Area as well as park partners and reduce congestion at scenic overlooks.
31 Existing trails connect Marin City to the Marin City Ridge. This area is served by transit
32 on Sundays by Muni bus service from San Francisco, with plans to expand service to
33 Saturdays when funding is available. Traffic congestion would continue to be
34 problematic during peak periods on roads connecting the Golden Gate Bridge with the
35 Headlands.

36 Along the southwest coast, (*Muir Beach to Point Bonita*) small roads serving Tennessee
37 Valley, Muir Beach, and Muir Woods National Monument experience traffic congestion
38 ranging from moderate on warm weekends to severe during peak periods. Neither
39 Tennessee Valley nor Muir Beach are served by transit.

1 In the Stinson area, access to Stinson Beach along Highway 1 and the Panoramic
2 Highway is congested on good weather weekends, approaching gridlock on summer
3 weekends. Stinson Beach is served by the West Marin Stagecoach.

4 The absence of any measures taken to improve transportation access to park sites in
5 Marin (beyond those already planned) would have a long-term, minor to moderate
6 adverse impact. While projects described in the Cumulative Impacts section would help
7 mitigate transportation shortcomings in the Headlands, other areas such as Muir Beach,
8 Muir Woods National Monument, and Stinson Beach would all continue to experience
9 long-term, moderate, adverse impacts on accessibility to visitors during peak periods.

10 ***San Francisco***

11 San Francisco park areas are well served by transit, and well-connected with bicycle and
12 pedestrian paths. Transit to the Fort Mason area is likely to be improved with the
13 development of the Van Ness BRT system, and further enhanced with the proposed
14 extension of the streetcar along the northern waterfront. Either of these measures would
15 provide a long-term, moderate to major, beneficial impact in connectivity and availability
16 of public transit to Fort Mason, Crissy Field, and the Presidio. Independent of these
17 external projects, the absence of further transportation measures would have a negligible
18 impact on access to park lands in San Francisco.

19 ***San Mateo County***

20 Under the no-action alternative, access to park lands in San Mateo County would
21 continue to be less accessible by all modes of transportation because of unimproved
22 trailheads, limited parking, minimal signage, and very limited transit access. Informal or
23 “social” trails would continue to be a significant way to enter parklands from adjacent
24 neighborhoods; such trails created by visitors can lead to deterioration of natural
25 resources. Accessibility for people with disabilities would continue to be limited. Auto
26 access would improve in 2011 when the Devil’s Slide tunnels are opened. Taking no
27 further transportation improvement actions in San Mateo would have a long-term,
28 moderate, adverse effect on access to these park sites, limiting access for many potential
29 visitors.

30 ***Alcatraz Island***

31 In the no-action alternative, transportation to and within Alcatraz Island is limited to
32 public water transport only, beginning by boarding the ferry at Pier 33 on San Francisco’s
33 Embarcadero, and ending at the Alcatraz arrival area. Ferry access would remain limited
34 to the concessionaire from Pier 33. Private boats cannot land on the island, although tour
35 boats can come within the 1,000 foot perimeter which defines the area managed by the
36 National Park Service. Once on the island, the only transportation provided is a shuttle
37 system for people with disabilities and their attendants. Bicycles are not allowed on the
38 island; access to open areas of the island is by foot only. The north end of the island
39 would remain closed to visitors, and island perimeter access would be year-round on
40 primary trails, and seasonal on others.

41 ***Conclusion***

42 In Marin County, auto access to the most popular destinations is likely to continue to be
43 difficult during peak periods, while bicycle and pedestrian access would improve,

1 particularly in the Headlands, because of projects outside of this planning process.
2 Existing transit service would continue to enable access to park lands in Marin County
3 for visitors without cars. The no-action alternative would have a long-term, minor to
4 moderate to major, adverse impact on the access to most popular sites, and a long-term,
5 minor, adverse effect on transportation in other areas, such as the Headlands.

6 Park sites in San Francisco County in the north part of the city would see long-term,
7 moderate, beneficial impact to access by land via improved transit implemented by the
8 San Francisco Municipal Transportation Agency.

9 Park lands in San Mateo County would see a long-term minor improvement in access by
10 land because of the Devil's Slide project. Taking no other transportation improvement
11 actions in San Mateo would have a long-term, moderate, adverse effect on access to these
12 park sites.

13 **The no-action alternative would have no impacts on transportation to or within Alcatraz.**

14

15 **Alternative 1: Connecting People with the Parks**

16 ***Analysis***

17 Alternative 1 proposes to improve and expand connectivity and access to parks through
18 new and improved transit (land or water), bicycle, and pedestrian access to and within the
19 park.

20 ***Marin County***

21 In addition to the actions common to all action alternatives, transportation-related
22 measures in alternative 1 would improve public transportation and multi-modal access to
23 all park sites in Marin County. Trails would be improved in all areas, increasing access
24 and connectivity to sites.

25 In the southeast coastal area (Rodeo Valley / McCullough and Conzelman Road), safe
26 pedestrian, bicycle, and motor vehicle access to overlooks and to interpretive and
27 recreational opportunities would be provided. This would have a long-term, moderate,
28 beneficial impact for visitors to this area. In the southwest coast area (*Muir Beach to*
29 *Point Bonita*) a trailhead and transit stop would be added to the Golden Gate Dairy. The
30 NPS would continue to work with Caltrans to improve the safety of Highway 1, including
31 exploring regularly scheduled transit. Increased transit access would have a long-term,
32 minor, beneficial impact for visitors in this area. Trails in the Lower Redwood Creek area
33 would be improved to connect Muir Woods Road to the equestrian facilities at Santos
34 Meadow. This may have a long-term, negligible effect on connections for visitors to this
35 area.

36 The Diverse Opportunities management zone in Rodeo Valley could include visitor
37 amenities such as improved trailheads and accessible trails, as well as camping,
38 picnicking, and orientation. These facilities would welcome visitors and give access to
39 the adjacent natural areas. Improved and accessible trails would provide a long-term,
40 minor, beneficial effect on circulation in this area. Housing for staff, interns and
41 volunteers would be provided within and adjacent to this management zone. A transit

1 stop would be added at Fort Barry. Increased transit access would have a long-term,
2 minor, beneficial impact for park and park partner's employees as well as visitors in this
3 area.

4 The National Park Service would collaborate with other agencies to develop a community
5 trailhead in Marin City. This would have a long-term, moderate, beneficial effect for
6 hikers accessing the Headlands from Marin City.

7 In Tennessee Valley, in collaboration with Marin County and the local community, park
8 managers would explore transit to the trailheads on peak season weekends, extend a
9 multi-use trail to connect with the Mill Valley Bike Path (and the San Francisco Bay
10 Trail), and manage traffic congestion. This may enable more people to visit on peak
11 weekends, since currently, some visitors are unable to find parking, and leave without
12 visiting the valley. These measures would have a long-term, moderate, beneficial impact
13 for Tennessee Valley, affecting most visitors by reducing traffic congestion on peak
14 weekends and providing other ways to access this popular location besides driving.

15 Some additional parking would be added at the trailhead in Oakwood Valley. This would
16 have a long-term, minor, beneficial impact in reducing crowded parking conditions on
17 Tennessee Valley Road.

18 At Stinson Beach and along the Highway 1/Panoramic park, the park staff would
19 collaborate with Caltrans, Marin County, and other land management agencies to
20 improve roadways and trail crossings for the safety and enjoyment of park visitors. New
21 facilities could include overlooks and trailheads with parking, enhanced trail and transit
22 connections, and a unified wayfinding system. A small trailhead parking area could be
23 developed in the vicinity of the former White Gate Ranch. These transportation
24 improvements would have a long-term, minor to moderate, beneficial impact on access
25 by land, parking availability, and improved public safety. Improvements east of
26 Panoramic Highway in the vicinity of Homestead Hill would enhance trail and transit
27 access in this area. Improvements would fit with the rural character of the area. Increased
28 trail and transit access would have a long-term, minor, beneficial impact in this area. Park
29 management would continue to seek increased transit to the Beach on peak-season
30 weekends. Increased transit access would have a long-term, moderate, beneficial impact
31 for visitors in this area.

32 ***San Francisco***

33 In addition to the actions common to all alternatives, alternative 1 provides greater
34 connectivity to San Francisco parks through improved transit, trails, and signage. This
35 alternative anticipates improved access to the Fort Mason Center by the extension of San
36 Francisco's historic streetcar system through the Fort Mason tunnel as well as
37 development of a water shuttle system connecting bayfront parks.

38 The park would continue to improve trails and trailheads throughout its San Francisco
39 park lands to make the park accessible to the broadest array of visitors. Sites would be
40 connected to each other and to communities by the trail system and the city's transit and
41 multi-modal access systems. These projects would have a long-term, minor to moderate,
42 beneficial effect on visitor connections.

1 Aside from the E-Line project, visitor access to the historic Alcatraz pier (Pier 4) for
2 interpretive programs and ferry access to Alcatraz Island would also be considered. If this
3 access is in addition to that from Pier 33, this would represent a long-term, moderate to
4 major, beneficial impact on connectivity to Alcatraz Island. Visitor circulation and
5 wayfinding improvements would be implemented in response to new adjacent bus,
6 streetcar and ferry connections. These projects would have a long-term, minor, beneficial
7 effect on visitor connections.

8 The park would improve the California Coastal Trail and other trail connections linking
9 Ocean Beach to Lands End, Fort Funston, city neighborhoods, and other park lands
10 including Golden Gate Park and Lake Merced. This would have a long-term, minor to
11 moderate, beneficial effect on connectivity between the park and neighborhoods for the
12 southwest San Francisco park sites.

13 ***San Mateo County***

14 In addition to the actions common to all alternatives, alternative 1 attempts to mitigate the
15 remoteness and lack of access to the San Mateo park lands by focusing on providing
16 more trail access to and between all park areas, as well as increasing parking and
17 improving transit connections. A comprehensive trail plan would be prepared to create a
18 sustainable regional trail network, providing greater opportunities to access park sites and
19 connect with local communities. Park managers would work with county transit providers
20 to improve transit connections to local trailheads and east–west transit between bayside
21 communities and Highway 1. Signage would be improved to make the parks more
22 visible. The significant increase in trail and transit access is likely to have a long- term,
23 moderate, beneficial impact on all park lands in San Mateo County.

24 Connections to the regional trail network at the Shelldance Nursery and the surrounding
25 public lands (SFPUC, San Pedro Valley County Park, McNee Ranch State Park, and
26 Rancho Corral de Tierra) would be developed in coordination with other land managers.
27 Additional connections to the Bay Area Ridge Trail and the Sawyer Camp Trail in the
28 SFPUC watershed would be enhanced. These projects would have a long-term, minor to
29 moderate, beneficial effect on connecting Golden Gate National Recreation Area in San
30 Mateo to other local and state park sites, regional trails, and surrounding communities.
31 Limited vehicular access to the San Francisco Bay Discovery Site National Historical
32 Landmark would be available by permit. Together, these actions would have a long-term,
33 minor, beneficial impact for visitors accessing these park lands.

34 Access to Mori Point would be enhanced with a modest trailhead and parking
35 improvements, providing a long-term, minor, beneficial impact.

36 Visitors would access the coastal areas through an enhanced and sustainable system of
37 multi-use trails. The trail network would connect local communities to the park and link
38 the ridges of Montara Mountain to the Pacific Ocean. Opportunities for a trail connection
39 to Sweeney Ridge through the SFPUC Watershed’s northwest corner would be explored.
40 Unnecessary roads could be converted to trails or removed. These projects would have a
41 long-term, moderate, beneficial impact on visitor access, connecting the coastal areas to
42 each other and to surrounding communities.

43

1 ***Alcatraz Island***

2 Alternative 1 includes the following transportation-related actions for Alcatraz. Some
3 indoor and outdoor areas on Alcatraz Island that are currently inaccessible would be re-
4 opened, while sensitive wildlife areas would remain protected. Parts of the perimeter trail
5 would be made accessible year-round. This action would have a long-term, minor,
6 beneficial impact on making currently inaccessible areas available to the public. The
7 National Park Service would prohibit boat tours and small boat landing in the Sensitive
8 Resources management zone (extending 100 feet from the island’s western shore). This
9 action would have a long-term, minor, adverse effect on water access to this side of the
10 island. The Scenic Corridor management Zone (extending beyond the Sensitive Access
11 management zone and along the island’s eastern shore) would be managed to
12 accommodate ferry service to the island. Boat tours around the island and some types of
13 water-based recreation, such as fishing, could be permitted. These actions would have a
14 long-term, minor, beneficial effect on access to the island.

15 The area adjacent to the entry pier would be managed to expand the capacity and range of
16 uses that may occur. This would enable Alcatraz Island to be part of the San Francisco
17 Bay Water Trail, welcoming nonmotorized boats via permits or reservations. This would
18 have a long-term, minor, beneficial effect on access to the island for those arriving in
19 private nonmotorized boats.

20 ***Conclusion***

21 In alternative 1, access by land to park sites in Marin County– including improved trails,
22 increased transit service, and wayfinding – would see a long-term, moderate, beneficial
23 effect, particularly during peak and shoulder seasons, and on holiday weekends
24 throughout the year. Increased transit service and stops would have a moderately
25 beneficial impact on both the functionality of the land-based transportation system and on
26 connectivity. It would not only provide more ways for people to get to the park sites, but
27 would also relieve congestion on the roads for both transit and motorists.

28 In San Francisco County, alternative 1 would have a long-term, moderate, beneficial
29 impact on both visitor connections and the functioning of the transportation system
30 through increased land and water transit and improved trails.

31 In San Mateo County, enhanced trail systems would provide a long-term, moderate to
32 major, beneficial effect on connections by land; there would be a long-term, moderate,
33 beneficial effect on transportation functionality through more transit availability and a
34 minor beneficial impact on parking.

35 At Alcatraz Island, the slight increase in boat and ferry traffic in the Scenic Corridor
36 management zone as well as the entry pier area could result in a long-term, minor,
37 beneficial impact by increasing access by water to the island. Re-opening improved areas
38 of the park and increasing currently limited trail access to year-round access would have
39 a long-term, minor, beneficial impact on pedestrian access to park features and
40 circulation on the island.

41

42

1 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

2 **Analysis**

3 Alternative 2 focuses on preserving the natural resources of the parks by carefully
4 controlling access and removing deteriorated or unused human-made structures, and has
5 the least impacts on transportation.

6 **Marin County**

7 In addition to the measures under *Actions Common to all Action Alternatives*, described
8 above, there are few actions in alternative 2 which would significantly improve or detract
9 from visitor access and connectivity. Little-used roads would be converted to trails. The
10 main Tennessee Valley trail which is currently open to hikers and equestrians would be
11 converted to a multi-use trail, opening the trail to bicycles as well. These actions would
12 provide a long-term, negligible to minor, beneficial impact in access and in modes of
13 travel.

14 Alternative 2 recommends that the South parking lot at Stinson Beach be removed and
15 the wetland restored. Since this lot comprises about 50% of the parking spaces at Stinson
16 Beach, removing the south parking lot would have to be carefully coordinated with the
17 town of Stinson Beach, the County of Marin, and Marin Transit in order to prevent major
18 adverse effects on the local community. Data from the *Comprehensive Transportation*
19 *Management Plan for Parklands in Southwest Marin, 2002*, shown in Table 43 below,
20 indicates that at present, the parking capacity at Stinson (approximately 840 cars) does
21 not meet demand on peak weekends for 1,050 spaces (2002). The projected peak-season
22 parking demand for 2023 is 1335 spaces, an increase of 285 spaces over the current
23 capacity. The following figure shows the parking demand for Stinson Beach in 2002 and
24 estimated demand for 2023.

25

26 **Table 18: Parking Capacity at Stinson Beach, 2002 & 2023**

27 2009 Parking Capacity: 839 With South lot removed: approximately 420

Parking Demand at Stinson Beach – 2002					
Peak		Shoulder		Off Season	
Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
365	1050	260	450	155	270
Estimated Parking Demand at Stinson Beach – 2023					
Peak		Shoulder		Off Season	
Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
465	1335	315	540	180	310

28

29 Parking overflow might only be a problem during peak weekends for the next few years,
30 with longer term excess demand on peak and shoulder weekends. As shown in Table 43,

1 reducing the parking to approximately 420 spaces is likely not to be a problem during the
2 off season (October through April). However, even during the off season, Stinson Beach
3 does see increased visitors on sunny weekends, particularly those with holiday Mondays,
4 so the off-season weekend estimates may be lower than actual demand.

5 The effects of inadequate parking on the town include spillover parking in
6 neighborhoods, and illegal parking. Enforcement of parking restrictions in Stinson Beach
7 is under the jurisdiction of the Marin County Sherriff. Since all of West Marin is
8 currently served by two law enforcement officers, consistent enforcement of parking
9 restrictions is unlikely to occur; enforcement and towing may have to be managed and
10 could involve support from the NPS. Parking tickets alone are ineffective in controlling
11 where people park in Stinson Beach; according to some residents, some visitors appear to
12 consider the cost of a parking ticket simply the price one pays to go to the beach. In a
13 community already experiencing severe levels of congestion on peak weekends, parking
14 reduction could lead to even greater traffic congestion as well as increased air pollution
15 as cars circle the parking lot and neighborhoods looking for parking spaces.

16 As demonstrated in community meetings held in May 2009, residents of Stinson Beach
17 are extremely concerned about the effects of traffic and of parking overflow problems in
18 neighborhoods adjacent to the beach. Any reduction in peak-season parking would have
19 to include as part of the measure significant proven mitigations in order to get local
20 support and to prevent the town from being inundated with vehicles. One such mitigation
21 might be increased transit service and greatly expanded marketing of transit and
22 alternative modes, including signs on Highway 101 warning of the lack of parking in
23 Stinson Beach. Currently Stinson Beach is served by Marin Transit's Stagecoach service.
24 Were parking to be reduced, the park staff may wish to partner with Marin Transit on
25 increased service frequency, earlier and later hours, and joint marketing efforts to reduce
26 the number of cars entering Stinson Beach. Closing the south parking lot may have long-
27 term, major, adverse impacts, since it could substantially restrict access to Stinson Beach
28 and lower the quality of the visitor experience because of increased traffic congestion.
29 Alternatively, with substantially increased transit service, along with aggressive
30 marketing and consistent parking enforcement, this may have a long-term, moderate,
31 beneficial impact on the Stinson Beach area by reducing the number of cars on local
32 roads.

33 Alternative 2 also includes a recommendation that, in the event of a catastrophic landslide
34 on Shoreline Highway, park managers would encourage abandonment of Highway 1
35 between Muir Beach and Stinson Beach in the affected segment. Highway 1 is a State
36 Highway, and is ultimately controlled by Caltrans. If Highway 1 between Muir Beach
37 and Stinson Beach were damaged and then abandoned at the affected segment, the
38 southwest coastal communities and the Stinson area would sustain a long-term, moderate,
39 adverse impact to connectivity. This would more than double the driving distance
40 between Muir Beach and Stinson Beach from 5 miles to 13 miles, and lengthen the
41 driving time from approximately 8 minutes to 30 minutes. This would have implications
42 for residents of both communities and for emergency access to those areas.

43

1 ***San Francisco County***

2 With its focus on preserving the natural environment, this alternative has no
3 transportation-related measures affecting San Francisco other than those common to all
4 alternatives.

5 ***San Mateo County***

6 In addition to the measures in the section *Common to all Action Alternatives* cited above,
7 the following narrative described the transportation measures for San Mateo County. At
8 Sweeney Ridge, Sneath Lane could be converted to a trail and connect to the Bay Area
9 Ridge Trail in the SFPUC watershed. Unnecessary fire roads could also be converted to
10 trails or removed if not historic, and natural resources restored. If acquired, a trailhead
11 would be located at Picardo Ranch with modest visitor support facilities (restroom, picnic
12 tables, parking). These measures are likely to result in a long-term, minor, beneficial
13 impact at Sweeney Ridge. In the SFPUC Watershed easement, Park managers would
14 promote access along the existing multi-use trail and the implementation of trail
15 improvements proposed in the San Francisco Watershed Management Plan (2002),
16 including completion of the north-south corridor through the watershed in areas of low
17 sensitivity. Completion of these actions could have a long-term, minor to moderate,
18 beneficial effect on access to these areas.

19 ***Alcatraz Island***

20 In alternative 2 visitor access to now-closed sites would be opened. Visitor access to the
21 north end of the island would be expanded to provide wildlife viewing and research while
22 carefully managing impacts to prevent disruption of natural resources. This would result
23 in a long-term, minor, beneficial impact on visitor circulation on Alcatraz.

24 The Scenic Corridor management zone (extending beyond the Sensitive Access
25 management zone and along the island's eastern shore) would be managed to
26 accommodate ferry access to the island. Some other types of water-based recreation
27 could also be permitted. This would result in a long-term, minor, beneficial impact on
28 visitor access to Alcatraz Island via water.

29 ***Conclusion***

30 For park lands in Marin County, impacts on access and connectivity for alternative 2 are
31 negligible, with two exceptions. A 50% reduction in parking at Stinson Beach could have
32 either a long-term, major, adverse impact on accessibility and user experience in Stinson
33 Beach during peak periods and holiday weekends by exacerbating an already difficult
34 traffic congestion situation, or a long-term, moderate, beneficial effect if combined
35 effectively with other efforts such as provision of transit, marketing of transit, and
36 enforcement of parking restrictions.

37 Closing a segment of Highway 1 between Muir Beach and Stinson Beach may have a
38 moderate to major, adverse impact on connectivity between these two communities.

39 There are no transportation actions for San Francisco for alternative 2.

40 In San Mateo, the transportation actions in Alternative 2 may result in a minor to
41 moderate, beneficial effect on connections by land through enhanced trail systems.

1 The improved access on Alcatraz Island to previously closed areas could result in a long-
2 term, minor, beneficial impact to connectivity by water transit, and access to sites on
3 Alcatraz Island via enhanced trails.

4

5 **Alternative 3: Focusing on National Treasures**

6 **Analysis**

7 In addition to the impacts highlighter below, the transportation impacts that are described
8 above in alternative 1 also apply to this alternative for park lands in Marin, San
9 Francisco, or San Mateo counties.

10 At Fort Funston, alternative 3 proposes relocating both access and parking to the edge of
11 Fort Funston, allowing restoration of dunes. This measure has long-term, minor, impacts
12 that could be considered either beneficial (for the restoration of the dunes) or adverse
13 (because visitors would have a longer walk to reach the beach). This action does not
14 appreciably limit or enhance visitors' ability to visit Fort Funston.

15 Alternative 3 envisions that visitors would be able to go to a larger number of locations
16 on Alcatraz Island than is currently available. The barriers to visitor access and
17 circulation includes rubble that would be removed, buildings stabilized, and new and
18 upgraded trails, including the perimeter trail. Pedestrian circulation would be improved
19 for many visitors, with more sites accessible. This could have a long-term, moderate,
20 beneficial impact on the visitor experience at Alcatraz Island, enhancing public safety by
21 stabilizing structures.

22 This alternative also includes consideration of additional ferry service from San
23 Francisco. Multiple ferry embarkation points could include the original Alcatraz dock
24 (Pier 4) at Fort Mason, with primary embarkation still from Pier 33. This added
25 embarkation would provide a historic program tours to Alcatraz Island that would leave
26 from the restored Pier 4 at the foot of Van Ness Avenue. This would likely have a long-
27 term, moderate, beneficial impact on visitor access to the island by providing more than
28 one place to board the ferry in San Francisco.

29 **Conclusion**

30 In alternative 3, the relocation of parking and access to Fort Funston in San Francisco has
31 a long-term, minor effect that is both slightly beneficial for preservation of the natural
32 environment with a slightly adverse impact on visitor access.

33 For Alcatraz Island, this alternative could result in a long-term, moderate, beneficial
34 increase in connectivity through additional ferry embarkation points; and a long-term,
35 moderate, beneficial increase in access to additional historic features over an expanded
36 area of the island because of trail expansion and improvement.

37

38

1 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

2 **No-Action Alternative**

3 ***Analysis***

4 The no-action alternative would generally call for the continuation of current
5 management, programs, operations, funded construction projects, and current levels of
6 annual operating funds.

7 Staffing levels would continue at current levels. While some divisions are staffed
8 adequately, others have the need for additional staff. For example, despite creative
9 approaches in supplementing the work of park maintenance staff, the required workload
10 needed to maintain and support the park assets exceeds available staff resources, resulting
11 in a significant maintenance backlog. The aging infrastructure within the park requires
12 increasing resources to maintain. Approximately 75% of the maintenance needs annually
13 go unmet due to funding, which results in an expanding backlog of deferred maintenance.

14 The demand for educational and interpretive programs exceeds what the interpretive staff
15 is able to provide. Other divisions, such as the Cultural Resources Division, are
16 supplemented by volunteer staff. The Natural Resources Division's staffing levels
17 prevent the park from completing the baseline studies and monitoring necessary to guide
18 the park's natural resources preservation efforts in the future. A lack of sufficient patrol
19 units has resulted in adverse impacts to resources. Additionally, due to staff limitations,
20 the management of volunteers is very limited; and therefore the volunteer program does
21 not have the capacity to grow and provide additional benefit to the parks.

22 While staff at Golden Gate National Recreation Area and Muir Woods National
23 Monument lead the field in many of the programs they spearhead—such as development
24 of partnerships, community based stewardship, and increased sustainability in many areas
25 of park operations—the continued impact of low staffing levels on park operations is
26 long-term, moderate, and adverse.

27 Facilities continue to deteriorate given minimal additional project funding and the current
28 inadequate annual base funding for maintenance. Even given the direction of the park
29 asset management plan for prioritizing funds, a large gap in maintenance funding would
30 result in an increase in the deferred maintenance backlog. Inadequate project and
31 operational funding would result in long-term, moderate, adverse impacts to park
32 facilities.

33 Facilities at Alcatraz Island are in an advanced stage of deterioration. Infrastructure for
34 utilities is another constraint on the island. For example, potable and wastewater must be
35 transported to and from the island by ferry. Water storage constraints also place limits on
36 the visitation and operations presence on the island. Fire system water storage and
37 distribution is an issue on the island. Power utilization and energy demands are also an
38 issue; power is generated by diesel engines, which pollute and also constrain operations
39 on the island. Each of these systems requires improvement for continued use at current
40 levels. A lack of future project funding would result in long-term, major, adverse impacts
41 to mission critical facilities on the island.

1 Facility location, condition, and available use also impact park operations. Maintenance
2 facilities do not meet the needs of the park; currently, long distances from storage and
3 maintenance facilities to job sites, and inappropriate storage facilities for equipment
4 affect the operations adversely and result in equipment deterioration. Park public safety is
5 also impacted negatively by the current location of facilities; currently, law enforcement
6 staff has limited facilities in the Headlands and no base of operations in the San Mateo
7 County area. The operations would continue to have long-term, moderate, adverse
8 impacts due to current maintenance and public safety facility locations, size, and lack of
9 modern and secure features.

10 Park partners are vital to the continued operation of the park, as they provide generous
11 funds, organize volunteers, and provide interpretive and educational programs. The
12 park's continued efforts at developing and maintaining partnerships would continue to
13 provide long-term, moderate, beneficial impacts to park operations.

14 The Volunteer-In-Parks Program is critical to the ongoing operation of Golden Gate
15 National Recreation Area and Muir Woods National Monument. In a typical year,
16 between 10,000 and 14,000 volunteers provide an excess of 300,000 volunteer hours to
17 various programs and efforts within the parks. The continued management of volunteer
18 programs at the two parks contribute a continuing long-term, moderate, beneficial impact
19 to park operations.

20 **Conclusion**

21 Inadequate staffing levels would result in continued long-term, moderate, and adverse
22 impacts to operations. Continued partner and volunteer efforts would result in long-term,
23 moderate, beneficial impacts to park operations, although these efforts would be limited
24 by current staffing levels. Inadequate project and operational funding would result in
25 long-term, major, adverse impacts to park facilities throughout the Golden Gate National
26 Recreation Area including Alcatraz Island. The inadequate maintenance and public safety
27 facilities and their locations would result in continued long-term, moderate, and adverse
28 impacts to operations.

29

30 **Alternative 1: Connecting People with the Parks**

31 **Analysis**

32 While designed to contribute to the protection of resources and the enhancement of
33 visitor opportunities, the proposals of alternative 1 will achieve these ends only if staffing
34 and operating funds are increased in accordance with the cost estimates identified for this
35 alternative. If funding and needed staffing levels are not made available when these
36 actions are implemented, then the proposed actions would have long-term, moderate,
37 adverse effects on park operations.

38 Additional staff needs projected under this alternative would supplement many of the
39 divisions with the people needed to achieve the resource and visitor experience objectives
40 of the alternative. Expanding operations into San Mateo County requires increasing
41 employees and support facilities in order to manage the existing and newly acquired
42 lands. In addition, some staff would be responsible for organizing and managing

1 volunteer groups—thus leveraging park resources with the expertise and enthusiasm of
2 willing community members and youth groups. While the park would be better able to
3 meet resource protection goals as well as visitor experience and safety through the
4 addition of these full-time equivalent employees (FTEs), salaries for these FTEs would
5 appreciably increase the operating budget and the need to develop additional
6 partnerships. Increased staff would result in long-term, moderate, beneficial impacts to
7 operations if appropriate funding is available, otherwise the actions of this alternatives
8 would continue the adverse impacts identified in the no-action alternative.

9 The proposed new or reconstructed facilities in this alternative would require additional
10 capital investments. If funded, the improvements would result in a decrease in the park's
11 deferred maintenance. Unless the cyclic maintenance budget is collaborated to maintain
12 the park's facilities as identified in this alternative, the deferred maintenance will
13 increase, even with an initial investment in that asset. Adjusting the operations and
14 maintenance budget to realistically reflect the true costs of a facility will have a long-
15 term, moderate, beneficial impact on park operations; otherwise, the impact would be
16 adverse and result in an increase of deferred maintenance.

17 Fundraising through park partners to support specific programs to improve park facilities
18 has often been successful, although maintenance funding is typically more difficult to
19 come by. The investment in facilities would improve facility conditions, reduce the
20 deferred maintenance backlog, meet sustainability goals, and improve the ability of the
21 park to meet its goals for natural and cultural resource protection and improve the visitor
22 experience. Construction, rehabilitation, restoration, and demolition projects proposed in
23 the alternative would result in long-term, major, beneficial impacts to park operations if
24 funding could be obtained. Construction activities would impact park operations in the
25 short-term and would be minor and adverse, as some inefficiency would be caused by the
26 closure of buildings during construction.

27 Enhancing park operations at Fort Funston would improve maintenance and public safety
28 functions in that area. The proposed “portals” at Rancho Corral de Tierra, Upper Fort
29 Mason, and Tennessee Valley would improve interpretation and public safety operations
30 with opportunities for visitors to access park staff. These changes would result in long-
31 term, moderate, beneficial impacts to park operations.

32 At Alcatraz Island, increases in staff would allow for increased levels of maintenance,
33 public safety, resource protection, and visitor services. These increases in staff would
34 result in long-term, moderate, beneficial impacts to operations, if the positions are
35 adequately funded.

36 Alternative 1 proposes extensive restoration and rehabilitation of facilities on Alcatraz
37 Island. These actions would result in long-term, moderate, beneficial impacts to the
38 operations of Alcatraz Island. Construction activities would result in minor, short-term,
39 adverse impacts due to the closure of facilities.

40 **Conclusion**

41 Increased number of park staff would result in long-term, moderate, beneficial impacts to
42 operations if appropriate, annual base funding is available. Construction, rehabilitation,
43 restoration, and demolition projects proposed in the alternative would result in long-term,

1 moderate, beneficial impacts to park operations by addressing deferred maintenance.
2 Construction activities would result in short term, minor, adverse impacts on park
3 operations, because of closures during the work. An expanded maintenance facility at
4 Fort Funston and the addition of three “portals” would result in long-term, moderate,
5 beneficial impacts to park operations.

6

7 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

8 ***Analysis***

9 While designed to contribute to the protection of resources and the enhancement of
10 visitor opportunities, the proposals of alternative 2 will achieve these ends only if staffing
11 and operating funds are increased in accordance with the cost estimates identified for this
12 alternative. If funding and needed staffing levels are not made available when these
13 actions are implemented, then the proposed actions would have long-term, moderate,
14 adverse effects on park operations.

15 This alternative would require significant increases in park staffing to manage the new
16 park lands in San Mateo County; educate visitors about the coastal ecosystems of the
17 area; gather baseline natural and cultural resource information, and use this information
18 to guide the future of these programs; maintain facilities and landscapes; and provide for
19 effective public safety in areas where visitors are concentrated as well as in more
20 primitive areas. Increases in staffing levels would result in long-term, moderate,
21 beneficial impact in the ability of the park to meet its operating and mission goals while
22 leveraging the support of partners and volunteers. However, salaries for these FTEs
23 would appreciably increase the operating budget and the need to develop additional
24 partnerships. Increased staffing would result in long-term, moderate, beneficial impacts
25 to operations if adequate funding accompanied the staffing increases.

26 The remove of noncritical facilities and the restoration of those landscapes would result
27 in fewer maintenance needs, the remove the deferred maintenance associated with those
28 structures, and the redistribution of park personnel and funds to remaining facilities.

29 Capital investment in facilities would improve facility conditions, help to reduce the
30 deferred maintenance backlog, and help to meet sustainability goals. If adequately
31 funded, construction, rehabilitation, restoration, and demolition projects proposed in the
32 alternative would result in long-term, moderate, beneficial impacts to park operations.
33 Construction and landscape restoration activities would result in short term, minor,
34 adverse impacts, caused by the closure of buildings and lands during construction or
35 restoration.

36 At Alcatraz Island, increases in staff would allow for improved maintenance as well as
37 increased resource protection and public safety, especially if visitor use extends into the
38 late evenings. Such increases in staff and work would result in long-term moderate,
39 beneficial impacts to operations if positions are adequately funded. The increased
40 difficulty for public safety to reach the more primitive areas of the island that would
41 become open in this alternative would result in long-term, negligible to minor, adverse
42 impacts to operations.

1 On Alcatraz Island, alternative 2 proposes wilding of many areas on the island and
2 stabilizing some structures as ruins. In addition, alternative 2 provides for various
3 treatments for each historic structure (e.g. stabilization, restoration, or rehabilitation).
4 Actions in this alternative will address structures that are in poor condition and pose
5 threat of injury to visitors and staff. The improved facility conditions would result in
6 long-term, moderate, beneficial impacts to the operations of Alcatraz Island and would
7 address the deferred maintenance issues. Construction activities would result in minor,
8 short-term, adverse impacts due to the closure of facilities. Increases in law enforcement
9 staff would allow for overnight experiences on the island.

10 **Conclusion**

11 Increased staff would result in long-term, moderate, beneficial impacts to operations if
12 accompanying funding is appropriate. Construction, stabilization, rehabilitation,
13 restoration, and demolition projects proposed in the alternative would result in long-term,
14 moderate, beneficial impacts to park operations and address deferred maintenance issues.
15 Construction and landscape restoration activities would result in minor, adverse impact in
16 the short-term, as some inefficiency would be caused by closure of buildings and lands
17 during construction or restoration. The increased difficulty for public safety to reach the
18 more primitive areas would result in long-term, minor, adverse impacts to operations.

19

20 **Alternative 3: Focusing on National Treasures**

21 **Analysis**

22 While designed to contribute to the protection of resources and the enhancement of
23 visitor opportunities, the proposals of alternative 3 will achieve these ends only if staffing
24 and operating funds are increased in accordance with the cost estimates identified for this
25 alternative. If funding and needed staffing levels are not made available when these
26 actions are implemented, then the proposed actions would have long-term, moderate,
27 adverse effects on park operations.

28 In addition to the impacts outlined in alternative 1, alternative 3 would require additional
29 park staff and park partners to support visitor programs and services throughout the park,
30 significant new interpretive and educational programs at Alcatraz Island, expanded
31 natural and cultural stewardship centers, and visitor programs associated with the park's
32 museum collection. These additional park staff would enable the park to provide
33 interpretive and educational programs that are especially tied to cultural and natural
34 resources associated with the Historic Immersion management zone. Additionally,
35 maintenance and public safety staff would require expanded hours at Alcatraz Island and
36 to manage the park lands in San Mateo County. Increased staff would result in long-term,
37 moderate, beneficial impacts to operations if appropriate funding is available; otherwise,
38 the actions of this alternatives would continue the adverse impacts identified in the no-
39 action alternative.

40 Increased restoration of nationally significant resources would benefit operations by
41 reducing deferred maintenance, improving facility conditions, and helping the park to
42 reach its sustainability goals. The construction, stabilization, rehabilitation, restoration,

1 and demolition projects proposed in the alternative would result in long-term, moderate,
2 beneficial impacts to park operations if funding could be obtained. Some construction
3 and landscape restoration activities would result in minor, adverse impacts on park
4 operations in the short-term, because of the closure of buildings and lands during
5 construction or restoration. Costs to implement this alternative would be somewhat
6 greater than historic capital project fund amounts. The ability of the park and partners to
7 raise needed funds would dramatically affect the ability to achieve the goals of
8 alternative 3.

9 Changes in facility use and location would result in moderate, long-term, beneficial
10 impacts to park operations. The establishment of a visitor center at Capehart, a hub at
11 Rancho Corral de Tierra, and additional visitor services at Fort Mason would make it
12 easier for park staff to provide educational and interpretive information to visitors
13 throughout the park. An operations area at Fort Miley would improve efficiencies in
14 public safety and maintenance in that area.

15 At Alcatraz Island, increases in staff would allow for improved maintenance as well as
16 for increased levels of public safety and resource protection. As this alternative proposes
17 a high level of restoration to nationally significant resources, these areas would need to
18 be staffed and managed accordingly. If adequately funded, these increases in staff would
19 result in long-term, moderate, beneficial impacts to park operations.

20 Also at Alcatraz Island, national treasure facilities would be stabilized, restored, or
21 rehabilitated. Currently, many of the facilities are in poor condition and pose the threat of
22 injury to visitors and staff. The improved facility conditions would result in long-term,
23 moderate, beneficial impacts to park operations at Alcatraz Island and help to address the
24 deferred maintenance issues. Construction activities would result in minor, short-term,
25 adverse impacts due to the closure of facilities. The funding needed to complete the
26 projects in this alternative is significant.

27 **Conclusion**

28 Increased staff would result in long-term, moderate, beneficial impacts to operations if
29 adequate funding accompanies the increase in park staffing. Construction, stabilization,
30 rehabilitation, restoration, and demolition projects proposed in the alternative would
31 result in long-term, moderate, beneficial impacts to park operations, but would also result
32 in short-term, minor, adverse impacts while the activities are underway. Facility use and
33 location changes would result in long-term, moderate, and beneficial impacts to park
34 operations.

35

36

POTENTIAL ENVIRONMENTAL IMPACTS AT MUIR WOODS NATIONAL MONUMENT

3

4 NATURAL RESOURCES – PHYSICAL RESOURCES

5 Carbon Footprint and Air Quality

6 *No Action Alternative*

7 *Analysis*

8 The continuation of current conditions and management would continue to result in
9 adverse impacts to air quality/carbon footprint. Baseline greenhouse gas (GHG)
10 emissions (2008) for Muir Woods National Monument are estimated at 2,257 metric tons
11 of carbon equivalent (MTCE).

12 Mobile combustion associated with visitor travel in personal automobiles and the pilot
13 shuttle would continue to be the largest contributor of GHG emissions (2,179 MTCE),
14 representing about 96% of gross emissions at the monument.

15 GHG emissions from visitors and NPS operations do contribute to elevated ozone and
16 other air quality concerns. The National Park Service would continue to reduce
17 greenhouse gas emissions by reducing energy consumption and replacing high-emitting
18 apparatus with green technology—resulting in a beneficial impact.

19 Overall, when compared to background levels of air pollution and GHG emissions in the
20 region or the nation (estimated at 6 billion in 2007), impacts to air quality from the no-
21 action alternative would be long-term, adverse, and negligible.

22 *Conclusion*

23 Total gross emissions for Muir Woods National Monument would be estimated at 2,257
24 MTCE, resulting in long-term, minor, adverse impacts to the monument’s carbon
25 footprint. Overall, when compared to background levels of air pollution and GHG
26 emissions in the region or the nation (estimated at 6 billion in 2007), impacts to air
27 quality from the no-action alternative would be long-term, adverse, and negligible.

28 No impairment of air resources would result from this alternative.

29 *Alternative 1: Connecting People with the Parks*

30 *Analysis*

31 Under alternative 1 visitor travel to the monument would be altered so that dependency
32 on personal automobiles would be reduced. About 25% of parking would be removed and
33 the Muir Woods shuttle would be expanded and could run on compressed natural gas, a
34 lower emissions fuel. As a result, mobile combustion is estimated to be reduced by 20%
35 to 1,740 metric tons of carbon equivalent (MTCE). When compared to the no-action
36 alternative, impacts to air quality/carbon footprint would be reduced—a beneficial
37 impact.

1 Emissions from stationary combustion and purchased electricity would be slightly
2 reduced when compared to the no-action alternative as result of facility removal and
3 corresponding reductions in energy usage. Emissions associated with wastewater
4 treatment and solid waste would be the same as under the no-action alternative.

5 Short-term adverse impacts to air quality would occur as a result of the construction
6 activities needed to remove facilities (buildings and parking areas) and reclaim the
7 disturbed sites.

8 Long-term, adverse impacts on air quality/carbon footprint would also be expected due to
9 increases in energy consumption and related emissions attributed to the new welcome
10 center / shuttle parking located on Highway 101.

11 The combined effect of the actions included in alternative 1 is estimated to decrease the
12 gross emissions of Muir Woods National Monument by 20% to 1,812 MTCE. This would
13 result in long-term, minor, beneficial impacts on the Park Service's carbon footprint. As
14 in the no-action alternative, impacts to air quality (when compared to background levels
15 of air pollution in the region and nation) would be negligible.

16 **Conclusion**

17 The combined effect of the actions included in alternative 1 is estimated to decrease the
18 gross emissions of Muir Woods National Monument by 20% to 1,812 MTCE. This would
19 result in long-term, minor, beneficial impacts on the Park Service's carbon footprint. As
20 in the no-action alternative, impacts to air quality (when compared to background levels
21 of air pollution in the region and nation) would be negligible.

22 No impairment of air resources would result from this alternative.

23 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

24 **Analysis**

25 Under alternative 2 visitor travel to the monument would be altered so that dependency
26 on personal automobiles would be significantly reduced. Most of the parking at the
27 monument would be removed and the Muir Woods shuttle would be expanded to a year-
28 round operation and could run on compressed natural gas, a lower emissions fuel. As a
29 result, mobile combustion is estimated to be reduced by 85% to 333 metric tons of carbon
30 equivalent (MTCE). When compared to the no-action alternative, impacts to air
31 quality/carbon footprint would be reduced—resulting in a beneficial impact.

32 Emissions from stationary combustion and purchased electricity would be slightly
33 reduced when compared to the no-action alternative as result of facility removal and
34 corresponding reductions in energy usage. Emissions associated with wastewater
35 treatment and solid waste would be the same as under the no-action alternative.

36 Short-term adverse impacts to air quality would occur as a result of the construction
37 activities needed to remove facilities (buildings and parking areas) and reclaim the
38 disturbed sites as well as from the restoration of Redwood Creek.

39 Long-term, adverse impacts on air quality/carbon footprint would also be expected due to
40 increases in energy consumption and related emissions attributed to the new welcome
41 center / shuttle parking located on Highway 101.

1 The combined effect of the actions included in alternative 1 is estimated to decrease the
2 gross emissions of Muir Woods National Monument by 82% to 401 MTCE. This would
3 result in long-term, major, beneficial impacts on the Park Service's carbon footprint. As
4 in the no-action alternative, impacts to air quality (when compared to background levels
5 of air pollution in the region and nation) would be negligible.

6 ***Conclusion***

7 The combined effect of the actions included in alternative 2 is estimated to decrease the
8 gross emissions of Muir Woods National Monument by 82% to 401 MTCE. This would
9 result in long-term, major, beneficial impacts on the Park Service's carbon footprint. As
10 in the no-action alternative, impacts to air quality (when compared to background levels
11 of air pollution in the region and nation) would be negligible.

12 No impairment of air resources would result from this alternative.

13 ***Alternative 3: Focusing on National Treasures (NPS Preferred***
14 ***Alternative for Muir Woods National Monument)***

15 ***Analysis***

16 Under alternative 3 visitor travel to the monument would be altered so that dependency
17 on personal automobiles would be reduced. About 25% of parking would be removed and
18 the Muir Woods shuttle would be expanded and could run on compressed natural gas, a
19 lower emissions fuel. As a result, mobile combustion is estimated to be reduced by 20%
20 to 1,740 metric tons of carbon equivalent (MTCE). When compared to the no-action
21 alternative, impacts to air quality/carbon footprint would be reduced—a beneficial
22 impact.

23 Emissions from stationary combustion and purchased electricity would be slightly
24 reduced when compared to the no-action alternative as result of facility removal and
25 corresponding reductions in energy usage. Emissions associated with wastewater
26 treatment and solid waste would be the same as under the no-action alternative.

27 Short-term adverse impacts to air quality would occur as a result of the construction
28 activities needed to remove facilities (buildings and parking areas) and reclaim the
29 disturbed sites as well as from targeted restoration of Redwood Creek.

30 Long-term, adverse impacts on air quality/carbon footprint would also be expected due to
31 increases in energy consumption and related emissions attributed to the new welcome
32 center / shuttle parking located on Highway 101.

33 The combined effect of the actions included in alternative 3 is estimated to decrease the
34 gross emissions of Muir Woods National Monument by 20% to 1,813 MTCE. This would
35 result in long-term, minor, beneficial impacts on the Park Service's carbon footprint. As
36 in the no-action alternative, impacts to air quality (when compared to background levels
37 of air pollution in the region and nation) would be negligible.

38 ***Conclusion***

39 The combined effect of the actions included in alternative 1 is estimated to decrease the
40 gross emissions of Muir Woods National Monument by 20% to 1,813 MTCE. This would
41 result in long-term, minor, beneficial impacts on the Park Service's carbon footprint. As

1 in the no-action alternative, impacts to air quality (when compared to background levels
2 of air pollution in the region and nation) would be negligible.

3 No impairment of air resources would result from this alternative.

4

5 **Soils and Geologic Resources and Processes**

6 ***No Action Alternative***

7 ***Analysis***

8 Under the no-action alternative, the presence and maintenance of existing facilities
9 (including structures, parking lots, roads, and trails) would continue to cause parkwide
10 impacts to soils and geologic resources due to the permanent loss and function of these
11 resources and from erosion associated with unsustainable trails and roads. The impact of
12 these activities would be long-term, minor to moderate, adverse, and localized, but would
13 occur throughout Muir Woods National Monument.

14 Projects to improve natural habitat values and ecosystem function, such as the
15 modification of trails and roads, would have beneficial effects on soils and geologic
16 resources and processes because they would improve or restore the functionality of
17 natural processes—the impact would be long-term, minor, beneficial, and localized.

18 Recreational use would continue to cause compaction and erosion of soils, resulting in
19 long-term, minor, adverse, localized impacts throughout the monument.

20 Park Service efforts to provide educational and participatory stewardship programs would
21 continue to have a beneficial effect on geologic resources and soils due to increased
22 public understanding and support for resource protection and management—the impact
23 would be long term, minor, beneficial, and monumentwide.

24 ***Conclusion***

25 Overall, the impact to geologic resources and soils from the no-action alternative would
26 be long-term, range from minor to moderate adverse to minor beneficial, and be localized
27 and monument-wide. Adverse impacts would occur from the presence and maintenance
28 of existing facilities and visitor use. Beneficial impacts would occur from restoration and
29 education and stewardship activities.

30 No impairment of geologic resources would result from this alternative.

31 ***Alternative 1: Connecting People with the Parks***

32 ***Analysis***

33 Under alternative 1, a variety of management zones would be used that would assist in
34 the protection of soils and geologic resources and processes. Approximately 91% of the
35 monument would be zoned using the Natural and Sensitive Resources zones.

36 The removal of facilities/structures and the reclamation of disturbed building sites in the
37 Camino del Cañon and Druid Heights area and the current entrance to Muir Woods
38 National Monument, as well as the removal of the upper parking lot, would improve soil
39 function and integrity and restore natural geologic processes. The impact of these

1 activities would be long-term, minor, beneficial, and localized. Short-term, minor,
2 adverse impacts (such as increased erosion or compaction in adjacent areas) would occur
3 during construction activities.

4 Visitor access and use would be expanded under alternative 1, resulting in increased soil
5 compaction and erosion; however, compared to use patterns under the no-action
6 alternative, only slight adverse impacts would be expected. Most impacts would be
7 contained within defined visitor use areas and on trails. The impact, especially in areas
8 off-trail, would be long-term, minor, adverse, and localized. This impact would occur in
9 areas throughout the monument.

10 New recreational development (new facilities at Bridge 4 and welcome center / shuttle
11 parking at Highway 101) would have long-term, adverse, localized impacts on soils and
12 geologic resources due to the permanent loss of soil function and integrity resulting from
13 new development and increased erosion from facility construction and maintenance. The
14 intensity of the impact would range from negligible to minor because in some cases the
15 impact would be confined to previously developed or disturbed sites.

16 Impacts from an expanded NPS educational and stewardship programs would enhance
17 the beneficial effect on soils and geologic processes due to increased public
18 understanding and support for resource protection and management—the impact would
19 be long-term, minor, beneficial, and monument-wide.

20 ***Conclusion***

21 Overall, the impact to soils and geologic resources and processes from alternative 1
22 would be short- and long-term, range from negligible adverse to minor beneficial, and be
23 localized. Adverse impacts would occur from new recreational development and
24 expanded visitor use. Beneficial impacts would occur from trail relocation, the restoration
25 of disturbed sites, and improved resource understanding and public support.

26 No impairment of geologic resources would result from this alternative.

27 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

28 ***Analysis***

29 Under alternative 2, a variety of management zones would be used that would assist in
30 the protection of soils and geologic resources and processes. Approximately 99% of the
31 park would be zoned using the Natural and Sensitive Resources zones —the greatest of
32 all the alternatives.

33 Nearly all of the built environment would be removed from Muir Woods National
34 Monument - facilities/structures in the Camino del Cañon and Druid Heights area as well
35 the current entrance and within the primeval redwood forest of the monument, the upper
36 and lower parking areas, unneeded management roads, and several miles of trails. In
37 addition, Redwood Creek would be restored. Restoration of these areas would reduce soil
38 erosion, improve soil function and integrity, and restore natural geologic processes. The
39 impact of these activities would be long-term, moderate, beneficial, and localized. Short-
40 term, minor, adverse impacts (such as increased erosion or compaction in adjacent areas)
41 would occur during demolition and restoration activities.

1 Impacts from visitor access and use would be less than those described in the no-action
2 alternative because it would be limited and highly controlled, resulting in long-term,
3 minor, beneficial, localized impacts.

4 Impacts from an expanded NPS educational and stewardship programs would enhance
5 the beneficial effect on soil and geologic resources due to increased public understanding
6 and support for resource protection and management—the impact would be long-term,
7 minor, beneficial, and monument-wide.

8 ***Conclusion***

9 Overall, the impact to soils and geologic resources and processes from alternative 2
10 would be short- and long-term, range from minor adverse to moderate beneficial, and
11 localized. Adverse impacts would occur from visitor use and construction. Beneficial
12 impacts would occur from the removal of facilities/structures and restoration of disturbed
13 sites.

14 No impairment of geologic resources would result from this alternative.

15 ***Alternative 3: Focusing on National Treasures***

16 ***Analysis***

17 Under alternative 3, a variety of management zones would be used that would assist in
18 the protection of soils and geologic resources and processes. Approximately 85% of the
19 monument would be zoned using the Natural and Sensitive Resources zones.

20 The impacts to geologic resources and soils from the continued maintenance of existing
21 facilities and structures under alternative 3 would be the less than the no-action
22 alternative. New recreational development (including a new welcome center/shuttle
23 parking at Highway 1, new recreational amenities near Bridge 4, new trails in the
24 monument, and picnicking facilities) would have long-term, minor, adverse, localized
25 impacts on geologic resources and soils due to the permanent loss of soil function and
26 integrity resulting from new development and increased erosion from facility
27 construction and maintenance.

28 Beneficial effects on geologic resources and soils would occur from the removal of
29 facilities/structures and restoration of disturbed sites throughout the monument (such as
30 the removal of the upper parking area; a number of structures in the Camino del Cañon
31 and Druid Heights; and targeted removal of rip rap along Redwood Creek)—a total of
32 about 28 acres of built environment would be removed and restored to natural conditions.
33 The impact of these activities would be long-term, moderate, beneficial, and localized.
34 Short-term, minor, adverse impacts (such as increased erosion or compaction in adjacent
35 areas) would occur during construction activities.

36 Visitor access and use would continue to cause adverse impacts to geologic resources and
37 soils due to the effects compaction and erosion. However, the impact would be less than
38 under the no-action alternative because primary use areas and trails would be moved
39 away from the creek (where soils may be more prone to compaction and erosion) and
40 new boardwalks would be developed that reduce these impacts—resulting in a beneficial
41 impact. The impacts to geologic resources and soils from visitor use under alternative 3
42 would be negligible.

1 Impacts from NPS educational and stewardship programs would generally be the same as
2 those described in the no-action alternative.

3 The expanded NPS interpretive, educational and stewardship programs would engage
4 many more visitors and could have a long-term, moderate, beneficial effect on soils and
5 geologic resources and processes due to increased public understanding and support for
6 resource protection and management—the impact would be long-term, moderate,
7 beneficial, and monumentwide.

8 ***Conclusion***

9 Overall, the impact to soils and geologic resources and processes from alternative 3
10 would be short- and long-term, range from negligible adverse to moderate beneficial, and
11 be localized. Adverse impacts would occur from new recreational development and
12 visitor use. Beneficial impacts would occur from the removal of facilities and structures
13 and restoration of the upper parking lot and disturbed sites, as well as creek restoration
14 activities.

15 No impairment of geologic resources would result from this alternative.

16

17 **Water Resources and Hydrologic Processes**

18 ***No Action Alternative***

19 ***Analysis***

20 Under the no-action alternative, the presence and maintenance (or lack of maintenance in
21 some cases) of existing facilities (including structures, roads, and trails) would continue
22 to cause localized impacts to water quality due to pollution from urban runoff and
23 turbidity from soil erosion. The impact of these activities would be long-term, minor to
24 moderate, adverse, and localized, but would occur throughout the monument.

25 Structures would remain in the 100-year floodplain of Redwood Creek resulting in
26 adverse impacts. Trails, bridges, administrative/concessionaire buildings, the gift shop,
27 restrooms are located in the floodplain. Retention of these facilities would continue to
28 affect floodplain function. The structures themselves could affect the flow of water
29 during floods and paved surfaces such as the parking area and portions of the trail system
30 could affect the capacity of the floodplain to store floodwaters. Furthermore, the existing
31 rock revetment that lines portions of Redwood Creek would continue to adversely affect
32 natural hydrologic processes and floodplain function. Riparian wetland expansion would
33 continue to be adversely affected by the presence of the parking area. The impact of these
34 activities would be long-term, moderate, adverse, and localized.

35 Recreational use would continue to cause erosion of soils resulting in turbidity. Vehicle
36 use at parking areas and on roadways in the vicinity of the monument would continue to
37 affect water quality from runoff that contains chemical contaminants. These activities
38 would result in long-term, minor, adverse, localized impacts to water quality.

39 Park Service efforts to provide educational and participatory stewardship programs would
40 continue to have a beneficial effect on water resources and hydrologic processes due to

1 increased public understanding and support for resource protection and management—
2 the impact would be long-term, minor, beneficial, and monumentwide.

3 **Conclusion**

4 Overall, the impact to water resources and hydrologic processes from the no-action
5 alternative would be long-term, range from minor adverse to minor beneficial, and be
6 localized and monumentwide. Adverse impacts would occur from the presence and
7 maintenance of existing facilities (including rock revetment), visitor use. Beneficial
8 impacts would occur from education and stewardship activities.

9 No impairment of water resources would result from this alternative.

10 **Alternative 1: Connecting People with the Parks (NPS Preferred**
11 **Alternative for park sites in Marin, San Francisco, and San Mateo**
12 **counties)**

13 **Analysis**

14 Under alternative 1, a variety of management zones would be used that would assist in
15 the protection of water resources and hydrologic processes. Approximately 91% of the
16 park would be zoned using the Natural and Sensitive Resources zones.

17 The removal of some facilities and structures and the reclamation of disturbed building
18 sites and roads in the Camino del Cañon and Druid Heights area and the main part of
19 Muir Woods National Monument, including removal of the upper parking lot, would
20 improve natural hydrologic processes. The impact would be long-term, minor, beneficial,
21 and localized. Short-term, minor, adverse impacts to water quality could occur from
22 sedimentation and runoff during construction and restoration activities.

23 Impacts to floodplains would be the same as described under the no-action alternative,
24 except for those associated with the removal of the upper parking area and restoration of
25 the site to a natural area. The removal of the upper parking area would eliminate the
26 impervious surface at the site, restoring floodwater capacity and natural floodplain
27 function—resulting in a long-term, minor, beneficial impact.

28 Visitor access and use would be expanded under alternative 1, potentially resulting in
29 some increase in erosion along trails and at primary visitor use areas that could have
30 impacts on water quality—the impact would be long-term, negligible to minor, adverse,
31 and localized.

32 New recreational development (new facilities at Bridge 4 and welcome center/shuttle
33 parking at Highway 101) could have short-term, negligible to minor, adverse, localized
34 impacts on water quality from increased erosion and sedimentation, and the potential for
35 chemical contamination resulting from inadvertent chemical spills from heavy equipment
36 at construction sites. Similar impacts to water quality could occur over the long-term due
37 to the increased potential for fecal coliform contamination and urban pollutants. Impacts
38 from these activities would result in long-term, minor, adverse, localized impacts to water
39 quality. However, on the other hand, the new restroom facility may reduce the presence
40 of human waste in Muir Woods National Monument and the associated water quality
41 impacts.

1 Impacts from an expanded NPS educational and stewardship programs would enhance
2 the beneficial effect on water resources and hydrologic processes due to increased public
3 understanding and support for resource protection and management—the impact would
4 be long-term, minor, beneficial, and monument wide.

5 ***Conclusion***

6 Overall, the impact to water-related resources from alternative 1 would be short- and
7 long-term, range from negligible adverse to minor beneficial, and be localized and
8 parkwide. Adverse impacts would occur from the presence and maintenance of existing
9 facilities (including rock revetment), new recreational development and expanded visitor
10 use. Beneficial impacts would occur from trail and road maintenance and the restoration
11 of disturbed sites and removal of the upper parking area.

12 No impairment of water resources would result from this alternative.

13 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

14 ***Analysis***

15 Under alternative 2, a variety of management zones would be used that would assist in
16 the protection of water resources and hydrologic processes. Approximately 99% of the
17 park would be zoned using the Natural and Sensitive Resources zones.

18 Alternative 2 would reduce impacts to water quality by eliminating erosion from
19 unsustainable trails and unneeded management roads, resulting in long-term, minor to
20 moderate, beneficial, localized impacts. Short-term, minor, adverse impacts to water
21 quality could occur from sedimentation and runoff during construction and restoration
22 activities.

23 The substantial removal of facilities/structures and the reclamation of disturbed building
24 sites and road in the Camino del Cañon and Druid Heights area and the main part of Muir
25 Woods National Monument, as well as the removal of the upper and lower parking areas,
26 would improve the natural hydrologic processes. The impact would be long-term,
27 moderate, beneficial, and localized. Short-term, minor, adverse impacts to water quality
28 could occur from sedimentation and runoff during construction and restoration activities.

29 Impacts to floodplains would include the removal of the upper and lower asphalt parking
30 areas and the restoration of about 6,700 linear feet of Redwood Creek (including rock
31 revetment) and its floodplain. This would restore floodwater capacity and natural
32 floodplain function and improve riparian wetlands and hydrologic processes. Water flow
33 and floodplain function would also be restored by removing or re-designing bridges.
34 These activities would result in long-term, moderate to major, beneficial impacts on
35 floodplains and related water resources.

36 Impacts from an expanded NPS educational and stewardship programs would enhance
37 the beneficial effect on water resources and hydrologic processes due to increased public
38 understanding and support for resource protection and management—the impact would
39 be long-term, minor, beneficial, and monument-wide.

40 ***Conclusion***

41 Overall, the impact to water-related resources from alternative 2 would be short- and
42 long-term, range from minor adverse to moderate-major beneficial, and be localized.

1 Adverse impacts would occur from expanded visitor use and restoration activities.
2 Beneficial impacts would occur from the restoration of disturbed sites, removal of
3 structures, facilities, roads, and asphalt parking areas and substantial creek and floodplain
4 restoration.

5 No impairment of water resources would result from this alternative.

6 **Alternative 3: Focusing on National Treasures (NPS Preferred**
7 **Alternative for Muir Woods National Monument)**

8 **Analysis**

9 Under alternative 3, a variety of management zones would be used that would assist in
10 the protection of water resources and hydrologic processes. Approximately 85% of the
11 park would be zoned using the Natural and Sensitive Resources zones.

12 Alternative 3 would reduce impacts to water quality by reducing erosion from
13 unsustainable trails and roads, resulting in long-term, minor, beneficial, localized
14 impacts. Short-term, minor, adverse impacts to water quality could occur from
15 sedimentation and runoff during construction and restoration activities.

16 The removal of facilities, structures, roads, and the reclamation of disturbed building sites
17 in the Camino del Cañon and Druid Heights area and the main part of Muir Woods
18 National Monument, as well as the removal of the upper parking area, would improve
19 would improve natural hydrologic processes. The impact would be long-term, minor,
20 beneficial, and localized. Short-term, minor, adverse impacts to water quality could occur
21 from sedimentation and runoff during construction activities.

22 Impacts to floodplains would include the removal of the upper parking area and
23 conversion of the remaining asphalt surface to a more pervious surface, as well as
24 targeted restoration of Redwood Creek (including rock revetment) and its floodplain.
25 This would restore flood water capacity and natural floodplain function and improve
26 riparian wetlands and hydrologic processes. Water flow and floodplain function would
27 also be restored by removing or re-designing bridges. These activities would result in
28 long-term, moderate, beneficial impacts on floodplains and related water resources.

29 Visitor access and use would be expanded under alternative 3, potentially resulting in
30 some increase in erosion along trails and at primary visitor use areas that could have
31 impacts on water quality – the impact would be long-term, negligible to minor, adverse,
32 and localized.

33 The expanded NPS interpretive, educational and stewardship programs would engage
34 many more visitors and could have a long-term, moderate, beneficial effect on water
35 resources and hydrologic processes due to increased public understanding and support for
36 resource protection and management—the impact would be long-term, moderate,
37 beneficial, and monument-wide.

38 **Conclusion**

39 Overall, the impact to water-related resources from alternative 3 would be short- and
40 long-term, range from negligible adverse to moderate beneficial, and be localized.
41 Adverse impacts would occur from the presence and maintenance of existing facilities
42 (including rock revetment), new recreational development and expanded visitor use and

1 construction and restoration activities. Beneficial impacts would occur from the
2 restoration of disturbed sites, removal of the upper parking area, improvements to
3 Redwood Creek and restoration of in the Camino del Cañon and Druid Heights area.
4 No impairment of water resources would result from this alternative.

5

6 **NATURAL RESOURCES - BIOLOGICAL RESOURCES**

7 **Habitat (Vegetation and Wildlife)**

8 ***No Action Alternative***

9 ***Analysis***

10 Under the no-action alternative, the presence and maintenance (or lack of maintenance in
11 some cases) of existing facilities (including structures, parking lots, roads, and trails)
12 would continue to cause localized impacts to vegetation and wildlife habitat by
13 fragmenting natural areas and increasing the potential for exotic plant species to displace
14 native species and affect native habitat. The rock revetment that lines Redwood Creek,
15 and the trails in the floodplain, are affecting vegetation and wildlife habitat by limiting
16 natural hydrologic process that support natural conditions. Furthermore, the developed
17 and hardened trails (such as boardwalks) themselves act as barriers to wildlife movement
18 on the ground and in the forest canopy. The impact of these activities would be long-
19 term, moderate, adverse, and localized, but would occur throughout the monument.

20 Rehabilitating disturbed sites would continue to improve the integrity and diversity of
21 habitats available to aquatic and terrestrial organisms. Ongoing vegetation management,
22 including the use of prescribed fire, and monitoring of plants and wildlife allows the
23 National Park Service to improve native habitat conditions. The impact of these activities
24 would be long-term, minor, beneficial, and localized.

25 Recreational use would continue to reduce habitat integrity by trampling plants,
26 introducing and increasing the spread of exotic species, causing disturbance (flushing and
27 displacement) to animals, and increasing the potential for human-wildlife conflict
28 resulting from habituation due to the presence of humans and the introduction of
29 unnatural food sources. Recreational use also generates noise and unnatural light sources
30 that affect wildlife. These activities would result in long-term, minor to moderate,
31 adverse, localized impacts throughout the monument.

32 Park Service efforts to provide educational and participatory stewardship programs would
33 continue to have a beneficial effect on water resources and hydrologic processes due to
34 increased public understanding and support for resource protection and management –
35 the impact would be long-term, minor, beneficial, and monument-wide.

36 ***Conclusion***

37 Overall, the impact to vegetation and wildlife habitat from the no-action alternative
38 would be long-term, range from minor-moderate adverse to minor beneficial, and be
39 localized and monument-wide. Adverse impacts would occur from the presence and
40 maintenance of existing facilities and visitor use. Beneficial impacts would occur from
41 restoration and ongoing management and monitoring activities.

1 No impairment of vegetation or wildlife resources would result from this alternative.

2 **Alternative 1: Connecting People With The Parks) NPS Preferred**
3 **Alternative For Park Sites In Marin, San Francisco, And San Mateo**
4 **Counties**

5 **Analysis**

6 Under alternative 1, a variety of management zones would be used that would assist in
7 the protection of vegetation and wildlife habitat. Approximately 91% of the park would
8 be zoned using the Natural and Sensitive Resources zones.

9 The removal of facilities/structures and the reclamation of disturbed building sites in the
10 Addition area and the main part of Muir Woods, as well as the removal of the upper
11 parking lot, would improve would improve vegetation and wildlife habitat by improving
12 habitat structure and the diversity of habitats available to support various species' needs.
13 Human-wildlife conflicts would be reduced because the food concession in the
14 monument would be eliminated, resulting in less wildlife habituation – a beneficial
15 impact. These kinds of activities would reduce environmental stressors and increase the
16 resiliency of species and systems to the effects of climate change. The impact would be
17 long-term, minor to moderate, beneficial, and localized. Short-term, minor, adverse
18 impacts to habitat could occur during construction activities.

19 Visitor access and use would be expanded under alternative 1, potentially resulting in
20 additional impacts to vegetation (trampling) and wildlife (disturbance) along trails and at
21 primary visitor use areas – the impact would be long-term, minor, adverse, and localized.

22 New recreational development (new facilities at Bridge 4 and welcome center at
23 Highway 101) would have long-term, negligible, adverse, localized impacts on
24 vegetation and wildlife due to the permanent loss of plants and wildlife habitat within the
25 construction footprint. Short-term, minor, adverse impacts to vegetation would also occur
26 from injury or loss of plants during construction activities; however, the area would be
27 re-planted with native plants and the natural habitat would be reclaimed. Similarly, short-
28 term adverse impacts to wildlife, such as disturbance, would occur during construction.

29 Impacts from an expanded NPS educational and stewardship programs would enhance
30 the beneficial effect on impacts to habitats due to increased public understanding and
31 support for resource protection and management – the impact would be long-term, minor,
32 beneficial, and monument-wide.

33 **Conclusion**

34 Overall, the impact to vegetation and wildlife habitat from alternative 1 would be short-
35 and long-term, range from negligible adverse to minor-moderate beneficial, and be
36 localized and parkwide. Adverse impacts would occur from new recreational
37 development and expanded visitor use. Beneficial impacts would occur from the
38 restoration of disturbed sites.

39 No impairment of water resources would result from this alternative.

40

1 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

2 **Analysis**

3 Under alternative 2, a variety of management zones would be used that would assist in
4 the protection of vegetation and wildlife habitat. Approximately 99% of the park would
5 be zoned using the Natural and Sensitive Resources zones.

6 Nearly all of the built environment would be removed from Muir Woods -
7 facilities/structures in the Addition area as well as in the main part of Muir Woods, the
8 upper and lower parking areas, unneeded management roads, and several miles of trails.
9 Restoration of about 6,700 linear feet of Redwood Creek would improve habitat structure
10 and the diversity of habitats available to support various species' needs – an enhancement
11 for aquatic and terrestrial organisms. Restoring the creek and its floodplain function
12 would result in increased soil deposition that would assist in the recruitment of redwood
13 trees. Human-wildlife conflicts would be reduced because the food concession in the
14 monument would be eliminated, resulting in less wildlife habituation – a beneficial
15 impact. These kinds of activities would reduce environmental stressors and increase the
16 resiliency of species and systems to the effects of climate change. The impact would be
17 long term, moderate to major, beneficial, and localized.

18 Short-term, minor, adverse impacts to vegetation would also occur from injury or loss of
19 plants during construction activities; however, the area would be re-planted with native
20 plants and the natural habitat would be reclaimed. Similarly, short-term adverse impacts
21 to wildlife, such as disturbance, would occur during construction.

22 Impacts from visitor access and use would be less than those described in the no-action
23 alternative because it would be limited and highly controlled, resulting in long-term,
24 minor, beneficial, localized impacts. Some impacts to vegetation (trampling) and wildlife
25 (disturbance) along trails and at primary visitor use areas would still occur.

26 Impacts from an expanded NPS educational and stewardship programs would enhance
27 the beneficial effect on habitats due to increased public understanding and support for
28 resource protection and management. In addition, partnering with other agencies to
29 manage visitor access and promote restoration and habitat management as part of the
30 UNESCO Biosphere Reserve would elevate this issue and could result in benefits to
31 vegetation and wildlife habitat. The above actions would result in long-term, minor,
32 beneficial, and monument-wide impacts.

33 **Conclusion**

34 Overall, the impact to vegetation and wildlife habitat from alternative 2 would be short-
35 and long-term, range from minor adverse to moderate-major beneficial, and be localized
36 and monument-wide. Adverse impacts would occur from visitor use and construction
37 activities. Beneficial impacts would occur from the restoration of disturbed sites and
38 creeks.

39 No impairment of water resources would result from this alternative.

40

1 **Alternative 3: Focusing on National Treasures (NPS Preferred**
2 **Alternative For Muir Woods National Monument)**

3 **Analysis**

4 Under alternative 3, a variety of management zones would be used that would assist in
5 the protection of vegetation and wildlife habitat. Approximately 85% of the park would
6 be zoned using the Natural and Sensitive Resources zones.

7 The removal of facilities/structures and the reclamation of disturbed building sites in the
8 Addition area and the main part of Muir Woods, as well as the removal of the upper
9 parking lot, would improve would improve vegetation and wildlife habitat by improving
10 habitat structure and the diversity of habitats available to support various species' needs.
11 Targeted restoration of Redwood Creek and its floodplain would improve habitat
12 structure and the diversity of habitats available to support various species' needs—an
13 enhancement for aquatic and terrestrial organisms. Human-wildlife conflicts would be
14 reduced because the food concession in the monument would be eliminated, resulting in
15 less wildlife habituation—resulting in a beneficial impact. These kinds of activities would
16 reduce environmental stressors and increase the resiliency of species and systems to the
17 effects of climate change. The impact would be long-term, moderate, beneficial, and
18 localized.

19 Short-term, minor, adverse impacts to vegetation would also occur from injury or loss of
20 plants during construction activities; however, the area would be re-planted with native
21 plants and the natural habitat would be reclaimed. Similarly, short-term adverse impacts
22 to wildlife, such as disturbance, would occur during construction.

23 New recreational development (new trails and additional visitor amenities) would cause
24 increased habitat fragmentation and loss, resulting in long-term, minor to moderate,
25 adverse, localized impacts.

26 Visitor access and use would be expanded under alternative 3, potentially resulting in
27 additional impacts to vegetation (trampling) and wildlife (disturbance) along trails and at
28 primary visitor use areas—the impact would be long-term, minor, adverse, and localized.

29 The expanded NPS interpretive, educational and stewardship programs would engage
30 many more visitors and could have a long-term, moderate, beneficial effect on habitats
31 due to increased public understanding and support for resource protection and
32 management—the impact would be long-term, moderate, beneficial, and monument-
33 wide.

34 **Conclusion**

35 Overall, the impact to vegetation and wildlife habitat from alternative 3 would be short-
36 and long-term, range from minor adverse to moderate beneficial, and be localized and
37 monument-wide. Adverse impacts would occur from visitor use and construction
38 activities. Beneficial impacts would occur from the restoration of disturbed sites and
39 creeks.

40 No impairment of water resources would result from this alternative.

41

1 **Special Status Species (Federal and State Threatened and**
2 **Endangered Species)**

3 ***No Action Alternative***

4 ***Introduction***

5 In general, many of the impacts to vegetation and wildlife described in the habitat section
6 of this chapter would apply to special status species. For example, visitor use and new
7 development would result in changes that would be adverse impacts to listed species and
8 their habitats. Likewise, vegetation management and creek restoration would result in
9 beneficial impacts to listed species and their habitats. Keeping this in mind, the analysis
10 provided below generalizes about the effects of land management priorities and, where
11 possible, focuses on the impacts that specific actions included in the alternatives may
12 have on listed species and their habitats.

13 ***Federal Threatened and Endangered***

14 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
15 **trout, Central California Coast (*O. mykiss*).** These two listed salmonid species are
16 analyzed together because of the similarities in their life characteristics, habitat
17 requirements, and the effects of impacts on the two species.

18 Within the vicinity of Muir Woods National Monument, coho salmon are restricted to
19 Redwood Creek and Eastkoot Creek in Marin County. Steelhead trout are restricted to
20 Redwood Creek and the drainages to Bolinas Lagoon and Rodeo Lagoon in Marin
21 County. Therefore, impacts would be restricted to these locations.

22 NPS activities, such as vegetation management, creek restoration, and efforts to improve
23 water quantity and quality within the Redwood Creek watershed, would have beneficial
24 impacts on maintaining habitat characteristics that support anadromous fish. Projects at
25 Muir Woods National Monument (vegetation management and creek restoration) would
26 have beneficial impacts on habitat parameters required by the two species. These projects
27 would improve riparian vegetation and in-stream habitat complexity—resulting in
28 improvements to spawning, rearing, and migratory habitats. Critical habitat would be
29 affected by restoration activities. Within the immediate project area, short-term, minor,
30 adverse, localized impacts to nearly all essential features of critical habitat (substrate,
31 water quality, water quantity, water temperature, water velocity, cover/shelter, food,
32 riparian vegetation, space, and safe passage conditions) would be expected. However,
33 these short-term impacts would be outweighed by the beneficial impacts expected to
34 occur over the long-term. The National Park Service would continue to monitor coho and
35 steelhead populations and habitat and inventory potential habitat.

36 Controlling and managing visitor use would reduce impacts to coho and steelhead, such
37 as habitat alteration and direct impacts from recreational use and development; however,
38 some adverse impacts would continue. The upper and lower parking areas, as well as the
39 rock revetment that lines sections of Redwood Creek, would continue to adversely affect
40 the integrity of fish habitat by impacting natural floodplain function and therefore habitat
41 integrity—an adverse impact.

42 The primary threats to coho and steelhead would continue to be loss and modification of
43 habitat, water diversions, habitat channelization, sedimentation, and degraded water

1 quality—adverse impacts associated with increased urbanization of the region.
2 Collectively, impacts to coho salmon and steelhead trout resulting from NPS actions that
3 are part of the no-action alternative (the continuation of current management and trends)
4 would be long-term, beneficial, minor, and localized. The determination of effect under
5 Section 7 of the Endangered Species Act would be “*may affect, likely to adversely affect*”
6 for project specific actions in the short-term, and “*may affect, not likely to adversely*
7 *affect*” for land use and monument management over the long-term. Consultation for
8 specific projects would occur as necessary.

9 **Northern spotted owl (*Strix occidentalis caurina*).** Suitable habitat for northern spotted
10 owls include all evergreen forested habitat north of Highway 1 in Marin County. Within
11 the planning area, known spotted owl populations are currently limited to Muir Woods
12 National Monument, Homestead Valley, and the Stinson Gulch area. Therefore, impacts
13 would be restricted to these locations.

14 Vegetation management actions designed to protect and enhance coniferous forest,
15 including old-growth, second growth and remnant stands, would provide potential
16 roosting, feeding, and nesting habitat for the owl—a beneficial impact. The National Park
17 Service would continue to monitor owl populations and survey potential habitat. Visitor
18 use in the area would continue to disturb owls. Barred owls would also likely continue to
19 invade preferred spotted owl habitats—an adverse impact. Ongoing actions to reduce
20 human-created noise and light at Muir Woods National Monument would result in
21 improvements to habitat conditions. Current actions to reduce barred owl use and nesting
22 would help reduce adverse impacts to spotted owls. The primary threat to the northern
23 spotted owl in the region would continue to be the loss of habitat – an adverse impact
24 associated with increased urbanization of the region. Other threats include expansion in
25 the range of the barred owl (*Strix varia*), West Nile virus, changes in habitat due to
26 Sudden Oak Death, and recreational pressure. Locally, in Muir Woods National
27 Monument, the primary threat is from barred owls. Collectively, impacts to the northern
28 spotted owl resulting from NPS actions that are part of the no-action alternative (the
29 continuation of current management and trends) would be long-term, minor, beneficial
30 and localized. The determination of effect under Section 7 of the Endangered Species Act
31 would be “*may affect, not likely to adversely affect.*”

32 **Marbled murrelet (*Brachyramphus marmoratus marmoratus*).** Marbled murrelet
33 surveys of Muir Woods National Monument have been completed but no murrelets have
34 been observed. Vegetation management actions designed to protect and enhance old-
35 growth redwood forest at the monument would continue to provide suitable nesting
36 locations for the murrelet – a beneficial impact. The primary threat to the marbled
37 murrelet would continue to be the loss of nesting habitat and increased nest predation due
38 to high corvid (i.e., crows and jays) densities—this would result in an adverse impact
39 associated with increased urbanization of the region. Collectively, impacts to the marbled
40 murrelet resulting from NPS actions that are part of the no-action alternative (the
41 continuation of current management and trends) would be long-term, minor, beneficial
42 and localized. The determination of effect under Section 7 of the Endangered Species Act
43 would be “*may affect, not likely to adversely affect.*”

44
45

1 **Conclusion**2 **Table 19: Potential Impacts to Special Status Species of Muir Woods National Monument,**
3 **No-action Alternative**

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	"may affect, likely to adversely affect" for project specific actions in the short-term, and "may affect, not likely to adversely affect" for land use and monument management over the long-term
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	"may affect, not likely to adversely affect"
Marbled murrelet (<i>Brachyramphus marmoratus marmoratus</i>)	Federal threatened	"may affect, not likely to adversely affect"

4

5 No impairment of listed species would result from this alternative.

6 **Alternative 1: Connecting People with the Parks**7 **Introduction**8 Under alternative 1, a variety of management zones would be used that would assist in
9 the protection of soils and geologic resources and processes. Approximately 91% of the
10 monument would be zoned using the Natural and Sensitive Resources zones.11 **Federal Threatened and Endangered**12 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
13 **trout, Central California Coast (*O. mykiss*).** In addition to the impacts described under
14 the no-action alternative, restoration activities (removal of some buildings and
15 reclamation of native habitat in the Camino del Cañon and Druid Heights area, removal
16 of the upper asphalt parking lot at the entrance, and relocation of trails) under alternative
17 1 would improve water quality and habitat conditions – a beneficial impact. The
18 construction of new facilities at Bridge 4 would affect water quality and instream habitat
19 causing short-term, minor, adverse, localized impacts to salmonids due to construction
20 and restoration activities. Collectively, impacts to coho salmon and steelhead trout
21 resulting from alternative 1 would be long-term, beneficial, minor, and localized. The
22 determination of effect under Section 7 of the Endangered Species Act would be "*may*
23 *affect, likely to adversely affect*" for project specific actions in the short-term, and "*may*
24 *affect, not likely to adversely affect*" for land use and monument management over the
25 long-term. Consultation for specific projects would occur as necessary.

1 **Northern spotted owl (*Strix occidentalis caurina*).** In addition to the impacts described
2 under the no-action alternative, restoration activities (removal of some buildings and
3 reclamation of native habitat in the Camino del Cañon and Druid Heights area and
4 removal of the upper parking lot at the entrance) under alternative 1 would improve
5 resource conditions and integrity, which could result in an increase of suitable nesting
6 habitat for spotted owls at Muir Woods National Monument. Impacts to the northern
7 spotted owl would be long-term, minor, beneficial, and localized. The determination of
8 effect under Section 7 of the Endangered Species Act would be “*may affect, not likely to*
9 *adversely affect.*”

10 **Marbled murrelet (*Brachyramphus marmoratus marmoratus*).** In addition to the
11 impacts described under the no-action alternative, restoration activities (removal of some
12 buildings and reclamation of native habitat in the Camino del Cañon and Druid Heights
13 area and removal of the upper parking lot at the entrance) under alternative 1 would
14 improve resource conditions and integrity, which could result in an increase of suitable
15 nesting habitat for the marbled murrelet at Muir Woods National Monument. Impacts to
16 the marble murrelet would be long-term, minor, beneficial, and localized. The
17 determination of effect under Section 7 of the Endangered Species Act would be “*may*
18 *affect, not likely to adversely affect.*”

19 **Conclusion**

20 **Table 20: Potential Impacts to Special Status Species of Muir Woods National Monument,**
21 **Alternative 1**

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	“ <i>may affect, likely to adversely affect</i> ” for project specific actions in the short-term, and “ <i>may affect, not likely to adversely affect</i> ” for land use and monument management over the long-term
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	“ <i>may affect, not likely to adversely affect</i> ”
Marbled murrelet (<i>Brachyramphus marmoratus marmoratus</i>)	Federal threatened	“ <i>may affect, not likely to adversely affect</i> ”

22

23 No impairment of listed species would result from this alternative.

24 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

25 **Introduction**

26 Under alternative 2, a variety of management zones would be used that would assist in
27 the protection of soils and geologic resources and processes. Approximately 99% of the
28 monument would be zoned using the Natural and Sensitive Resources zones.

1 ***Federal Threatened and Endangered***

2 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
3 **trout, Central California Coast (*O. mykiss*).** In addition to the impacts described under
4 the no-action alternative, restoration activities (removal of buildings and reclamation of
5 native habitat throughout the monument, removal of the upper and most of the lower
6 asphalt parking area, and the restoration of about 6,700 linear feet of Redwood Creek,
7 including removal of the rock rip rap, and its floodplain) under alternative 2 would
8 improve water quality and habitat conditions. Water flow and floodplain function would
9 be improved by removing or re-designing bridges that constrain floodplain function.
10 Woody debris in the creek would increase as a result of restoring natural processes and
11 would improve habitat structure and available nutrients to coho and steelhead. All of
12 these activities would result in improvements to spawning and rearing habitat – a
13 beneficial impact. There would be short-term adverse impacts from construction that
14 would be outweighed by long-term habitat improvements. Collectively, impacts to coho
15 salmon and steelhead trout resulting from alternative 2 would be long-term, beneficial,
16 moderate, and localized. The determination of effect under Section 7 of the Endangered
17 Species Act would be “*may affect, likely to adversely affect*” for project specific actions
18 in the short-term, and “*may affect, not likely to adversely affect*” for land use and
19 monument management over the long-term. Consultation for specific projects would
20 occur as necessary.

21 **Northern spotted owl (*Strix occidentalis caurina*).** In addition to the impacts described
22 under the no-action alternative, restoration activities (removal of buildings and
23 reclamation of native habitat throughout the monument, removal of the upper and most of
24 the lower parking lot at the entrance, and the restoration of the Redwood Creek and its
25 floodplain) under alternative 2 would improve resource conditions and integrity, which
26 could result in an increase of suitable nesting habitat for spotted owls at Muir Woods
27 National Monument. Forage opportunities would likely improve as a result of these
28 activities. The scale of beneficial impacts under alternative 2 is greater than no-action
29 alternative. Impacts to the northern spotted owl under alternative 2 would be long-term,
30 minor to moderate, beneficial, and localized. The determination of effect under Section 7
31 of the Endangered Species Act would be “*may affect, not likely to adversely affect.*”

32 **Marbled murrelet (*Brachyramphus marmoratus marmoratus*).** In addition to the
33 impacts described under the no-action alternative, restoration activities (removal of
34 buildings and reclamation of native habitat throughout the monument, removal of the
35 upper and most of the lower parking lot at the entrance, and the restoration of the
36 Redwood Creek and its floodplain) under alternative 2 would improve resource
37 conditions and integrity, which could result in an increase of suitable nesting habitat for
38 the marbled murrelet at Muir Woods National Monument. Forage opportunities would
39 likely improve as a result of these activities. The scale of beneficial impacts under
40 alternative 2 is greater than the no-action alternative. Impacts to the marbled murrelet
41 under alternative 2 would be long-term, minor to moderate, beneficial, and localized. The
42 determination of effect under Section 7 of the Endangered Species Act would be “*may*
43 *affect, not likely to adversely affect.*”

44

1 **Conclusion**

2 **Table 21: Potential Impacts to Special Status Species of Muir Woods National Monument,**
3 **Alternative 2**

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	“may affect, likely to adversely affect” for project specific actions in the short-term, and “may affect, not likely to adversely affect” for land use and monument management over the long-term
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	“may affect, not likely to adversely affect”
Marbled murrelet (<i>Brachyramphus marmoratus marmoratus</i>)	Federal threatened	“may affect, not likely to adversely affect”

4 No impairment of listed species would result from this alternative.

5 **Alternative 3: Focusing on National Treasures (NPS Preferred**
6 **Alternative for Muir Woods National Monument)**

7 **Introduction**

8 Under alternative 3, a variety of management zones would be used that would assist in
9 the protection of soils and geologic resources and processes. Approximately 85% of the
10 monument would be zoned using the Natural and Sensitive Resources zones.

11 **Federal Threatened and Endangered**

12 **Coho salmon, Central California Coast (*Oncorhynchus kisutch*) and Steelhead**
13 **trout, Central California Coast (*O. mykiss*).** In addition to the impacts described under
14 the no-action alternative, restoration activities (removal of buildings and reclamation of
15 native habitat in the Camino del Cañon and Druid Heights area, removal of the upper
16 asphalt parking lot at the entrance, and relocation of trails) under alternative 3 would
17 improve water quality and habitat conditions – a beneficial impact. Targeted, but limited,
18 restoration of Redwood Creek would improve resource conditions and integrity, resulting
19 in improvements to spawning and rearing habitat. Water flow and floodplain function
20 would be improved by removing or re-designing bridges that constrain floodplain
21 function. There would be short-term adverse impacts from construction and restoration
22 that would be outweighed by long-term habitat improvements. Collectively, impacts to
23 coho salmon and steelhead trout resulting from alternative 3 would be long-term,
24 beneficial, minor to moderate, and localized. The determination of effect under Section 7
25 of the Endangered Species Act would be “may affect, likely to adversely affect” for
26 project specific actions in the short-term, and “may affect, not likely to adversely affect”

1 for land use and monument management over the long-term. Consultation for specific
2 projects would occur as necessary.

3 **Northern spotted owl (*Strix occidentalis caurina*).** In addition to the impacts described
4 under the no-action alternative, restoration activities (removal of buildings and
5 reclamation of native habitat in the Camino del Cañon and Druid Heights area and
6 removal of the upper parking lot at the entrance) under alternative 3 would improve
7 resource conditions and integrity, which could result in an increase of suitable nesting
8 habitat for spotted owls at Muir Wood National Monument. Realignment of the Old Muir
9 Woods road would reclaim some of the owl’s mapped foraging habitat. Targeted, but
10 limited, restoration of Redwood Creek would improve resource conditions and integrity,
11 resulting in potential improvements to nesting and foraging habitats. Visitor use would
12 affect more areas of the monument under alternative 3 potentially resulting in increased
13 disturbance to individuals and potential owl nesting habitat – a long-term, minor, adverse,
14 localized impact.

15 Collectively, impacts to the northern spotted owl from alternative 3 would be long-term,
16 minor, beneficial, and localized. The determination of effect under Section 7 of the
17 Endangered Species Act would be “*may affect, not likely to adversely affect.*”

18 **Marbled murrelet (*Brachyramphus marmoratus marmoratus*).** In addition to the
19 impacts described under the no-action alternative, restoration activities (removal of
20 buildings and reclamation of native habitat in the Camino del Cañon and Druid Heights
21 area and removal of the upper parking lot at the entrance) under alternative 3 would
22 improve resource conditions and integrity, which could result in an increase of suitable
23 nesting habitat for the marbled murrelet at Muir Woods National Monument. Targeted,
24 but limited, restoration of Redwood Creek would improve resource conditions and
25 integrity, resulting in potential improvements to nesting and foraging habitats. Impacts to
26 the marble murrelet would be long-term, minor, beneficial, and localized. The
27 determination of effect under Section 7 of the Endangered Species Act would be “*may*
28 *affect, not likely to adversely affect.*”

29 **Conclusion**

30 **Table 22: Potential Impacts to Special Status Species of Muir Woods National Monument,**
31 **Alternative 3**

Species	Status	ESA Determination
Coho salmon, Central California Coast (<i>Oncorhynchus kisutch</i>) and Steelhead trout, Central California Coast (<i>O. mykiss</i>)	Federal threatened	“ <i>may affect, likely to adversely affect</i> ” for project specific actions in the short-term, and “ <i>may affect, not likely to adversely affect</i> ” for land use and monument management over the long-term
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Federal threatened	“ <i>may affect, not likely to adversely affect</i> ”

Marbled murrelet (<i>Brachyramphus marmoratus marmoratus</i>)	Federal threatened	"may affect, not likely to adversely affect"
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1

2 No impairment of listed species would result from this alternative.

3

4 **CULTURAL RESOURCES**

5 **Archeological Resources**

6 ***No Action Alternative***

7 ***Analysis***

8 Currently, there is little information available concerning prehistoric and historic
9 archeological resources at Muir Woods National Monument. A comprehensive
10 archeological surveys and consultation with American Indian tribes regarding
11 archeological sites with ethnographic significance is needed. However, those known
12 archeological resources are protected and preserved as they are identified. Without a
13 comprehensive approach to archeological surveys, this resource may be subject to
14 potential deterioration, lack of adequate protection in some cases, and possible loss of
15 integrity from natural processes and/or inadvertent visitor activity.

16 ***Conclusion***

17 Little information is available concerning prehistoric and historic archeological resources
18 at Muir Woods National Monument and a comprehensive archeological survey and
19 consultation with American Indian tribes are needed. Known archeological resources are
20 protected and preserved as they become identified. Until a comprehensive survey is
21 implemented, there is a potential for deterioration and lack of protection as a result of
22 natural process and/or inadvertent visitor activity.

23 Under this alternative, the Section 106 determination of effect on archeological resources
24 would be *adverse effect*.

25 ***Alternative 1: Connecting People with the Parks***

26 ***Analysis***

27 Archeological resources would be protected from unauthorized removal or other
28 destructive activities. Modification or relocation of trails and existing facilities could
29 affect the integrity of some archeological resources, but every effort would be undertaken
30 to avoid known or discovered archeological sites. If such sites could not be avoided,
31 mitigation procedures would be undertaken in consultation with the California State
32 Historic Preservation Office. This alternative would result in more opportunities to
33 identify, evaluate, and provide stabilization, security, or other protection to archeological
34 resources commensurate with their significance and sensitivity since the majority of the
35 monument would be covered by the Natural management zone. In the Diverse
36 Opportunities and Scenic Corridor management zones archeological resources would be

1 stabilized and/or rehabilitated and incorporated into visitor opportunities, thus enhancing
2 their protection through increased awareness and understanding.

3 ***Conclusion***

4 Archeological resources would continue to be protected and preserved. Throughout the
5 monument the archeological resources would be stabilized and secured and in some
6 management zones that would be rehabilitated and incorporated into visitor opportunities.

7 Under this alternative, the Section 106 determination of effect on archeological resources
8 in Muir Woods National Monument would be *no adverse effect*.

9 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

10 ***Analysis***

11 Archeological resources would be protected from unauthorized removal or other
12 destructive activities. Removal of much of the built environment, redesign of the
13 monument's trail system, and restoration of natural processes could affect the integrity of
14 some archeological resources, but every effort would be undertaken to avoid known or
15 discovered archeological sites. If such sites could not be avoided, mitigation procedures
16 would be undertaken in consultation with the California State Historic Preservation
17 office.

18 Since much of the monument would be in the Sensitive Resources management zone
19 under this alternative, archeological resources would be identified, evaluated, and
20 provided stabilization, security, or other protection commensurate with their significance
21 and sensitivity.

22 ***Conclusion***

23 Archeological resources would be protected from unauthorized removal or other
24 destructive human activities. Throughout the monument the archeological resources
25 would be stabilized and secured.

26 Under this alternative, the Section 106 determination of effect on archeological resources
27 in Muir Woods National Monument would be *no adverse effect*.

28 ***Alternative 3: Focusing on National Treasures***

29 ***Analysis***

30 Archeological resources would be protected from unauthorized removal or other
31 destructive activities. Construction of new trails and relocation/redesign of others and
32 restoration of some natural processes could affect the integrity of some archeological
33 resources, but every effort would be undertaken to avoid known or discovered
34 archeological sites. If such sites could not be avoided, mitigation procedures would be
35 undertaken in consultation with the California State historic Preservation Office.

36 In the Interpretive Corridor management zone, which embraces the redwood groves and
37 Redwood Creek area in this alternative, archeological resources might be incorporated
38 into interpretive opportunities for visitors. Archeological resources in much of the rest of
39 the monument (managed under the Sensitive Resources management none) would be
40 identified, evaluated, and provided stabilization, security, or other protection
41 commensurate with their significance and sensitivity.

1 **Conclusion**

2 Archeological resources would be protected and preserved.

3 In some management zones, archeological resources might be incorporated into
4 interpretive opportunities for visitors. Archeological resources in much of the rest of the
5 monument would be stabilized and secured.

6 Under this alternative, the Section 106 determination of effect on archeological resources
7 in Muir Woods National Monument would be *no adverse effect*.

8

9 **Ethnographic Resources/Traditional Cultural Properties**

10 **No Action Alternative**

11 *Analysis*

12 There are no identified ethnographic resources/traditional cultural properties in Muir
13 Woods National Monument.

14 *Conclusion*

15 There are no identified ethnographic resources/traditional cultural properties in Muir
16 Woods National Monument.

17 Under this alternative, the Section 106 determination of effect on ethnographic
18 resources/traditional cultural properties would be *no historic properties affected*.

19 **Alternative 1: Connecting People with the Parks**

20 *Analysis*

21 There are no identified ethnographic resources/traditional cultural properties in Muir
22 Woods National Monument.

23 *Conclusion*

24 There are no identified ethnographic resources/traditional cultural properties in Muir
25 Woods National Monument.

26 Under this alternative, the Section 106 determination of effect on ethnographic
27 resources/traditional cultural properties in Muir Woods National Monument would be *no*
28 *historic properties affected*.

29 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

30 *Analysis*

31 There are no identified ethnographic resources/traditional cultural properties in Muir
32 Woods National Monument.

33 *Conclusion*

34 There are no identified ethnographic resources/traditional cultural properties in Muir
35 Woods National Monument.

1 Under this alternative, the Section 106 determination of effect on ethnographic
2 resources/traditional cultural properties in Muir Woods National Monument would be *no*
3 *historic properties affected*.

4 **Alternative 3: Focusing on National Treasures**

5 **Analysis**

6 There are no identified ethnographic resources/traditional cultural properties in Muir
7 Woods National Monument.

8 **Conclusion**

9 There are no identified ethnographic resources/traditional cultural properties in Muir
10 Woods National Monument.

11 Under this alternative, the Section 106 determination of effect on ethnographic
12 resources/traditional cultural properties in Muir Woods National Monument would be *no*
13 *historic properties affected*.

14

15 **Historic Buildings**

16 **No Action Alternative**

17 **Analysis**

18 Historically significant rustic buildings in Muir Woods National Monument Historic
19 District at the edge of the redwood forest adjacent to Redwood Creek, such as the
20 Administrative-Concession Building, have been maintained and afforded minimal
21 preservation treatment as opportunities have arisen and are adaptively used for
22 visitor/administrative services and park operations. To the rear of the Administrative-
23 Concession Building the utility area contains a collection of historically significant
24 buildings, including the Superintendent's Residence, Garage, and Equipment Shed, that
25 have been maintained and afforded preservation treatment as opportunities have arisen
26 and are adaptively used for park operations and administrative purposes resulting in long-
27 term, negligible, and beneficial impact.

28 The multiple historic rustic buildings at Camp Hillwood have been determined eligible
29 for listing in the National Register of Historic Places and are maintained for various
30 adaptive uses. Plans for evaluating other historic buildings under National Register
31 criteria in the Muir Woods Addition (including the Camino del Canon, Conlan Avenue,
32 and Druid Heights areas) are currently underway. Buildings determined eligible for
33 listing in the national register will be afforded appropriate preservation treatment.
34 Currently, these historic buildings range from long-term, negligible and beneficial to
35 minor and adverse impacts.

36 **Conclusion**

37 The historically significant rustic buildings in Muir Woods National Monument Historic
38 District have been afforded preservation treatments and are adaptively used for
39 visitor/administrative services and park operations. resulting in long-term, negligible, and
40 beneficial impact.

1 The multiple historic rustic buildings at Camp Hillwood and other structures in the Muir
2 Woods Addition have been maintained for various adaptive uses and impacts to these
3 structures range from negligible and beneficial to minor and adverse.

4 Under this alternative, the Section 106 determination of effect on historic buildings in
5 Muir Woods National Monument would be *no adverse effect*.

6 No impairment of Historic Buildings would result from this alternative.

7 **Alternative 1: Connecting People with the Parks**

8 **Analysis**

9 Under alternative 1, the Administrative-Concession Building would be rehabilitated and
10 adaptively used to support interpretive, educational, and stewardship activities, while the
11 Superintendent's Residence and associated buildings would be rehabilitated and
12 adaptively used for administrative purposes. The Camp Hillwood rustic buildings would
13 be rehabilitated and adaptively used for day use or overnight educational opportunities,
14 while all park operational functions would be relocated from the Muir Woods Addition
15 area (including the Camino del Canon, Conlan Avenue, and Druid Heights areas) to other
16 sites resulting in long-term, negligible and beneficial impacts.

17 Plans for evaluating the historic buildings in the Muir Woods Addition area under
18 National Register of Historic Places criteria are currently underway. Buildings
19 determined eligible for listing in the national register would be retained and afforded
20 appropriate preservation treatment for adaptive use, while nonhistoric buildings and
21 buildings determined to be nonessential in the Addition would be removed resulting in a
22 long-term, negligible and beneficial impact.

23 **Conclusion**

24 Historically significant rustic buildings, such as the Administrative-Concession Building,
25 Superintendent's Residence and associated buildings, and Camp Hillwood buildings,
26 would be rehabilitated and adaptively used for interpretive, educational, recreational,
27 administrative, and stewardship activities/purposes resulting in long-term, negligible and
28 beneficial impacts.

29 If structures within the Muir Woods Addition are determined eligible for listing in the
30 national register of Historic Places would be retained and afforded preservation treatment
31 for adaptive use, while nonhistoric buildings or buildings determined to be nonessential
32 in the Addition would be removed resulting in long-term, negligible, beneficial impacts.

33 Under this alternative, the Section 106 determination of effect on historic buildings in
34 Muir Woods National Monument would be *no adverse effect*.

35 No impairment of Historic Buildings would result from this alternative.

36 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

37 **Analysis**

38 To more fully restore the primeval character and natural conditions of the old growth
39 redwood forest the majority of the built environment in Muir Woods National
40 Monument, including historic buildings (i.e., the Superintendent's Residence and its
41 associated buildings, the Administration-Concession Building, and the Camp Hillwood

1 buildings) would be removed. Although the buildings in the Muir Woods Addition area
2 (including the Camino del Canon, Conlan Avenue, and Druid Heights areas) would be
3 evaluated under National Register of Historic Places criteria, all historic buildings in the
4 area would be removed under this alternative, and the area restored to a more natural
5 setting. SHPO narrative Need to discuss how to describe the impact and impairment.

6 **Conclusion**

7 To fully restore the primeval character and natural conditions of the monument virtually
8 all historic buildings in the park (including those yet to be evaluated in the Muir Woods
9 Addition area) would be removed under this alternative.

10 Under this alternative, the Section 106 determination of effect on historic buildings in
11 Muir Woods National Monument would be *adverse effect*.

12 No impairment of Historic Buildings would result from this alternative.

13 **Alternative 3: Focusing on National Treasures**

14 **Analysis**

15 Under alternative3, the historically-significant buildings in the Muir Woods National
16 Monument Historic District that are associated with the American conservation
17 movement, such as the Administration-Concession Building and Superintendent's
18 Residence and associated buildings, would be rehabilitated and adaptively used to
19 support visitor programming and services. The historic integrity of the Administration-
20 Concession Building would be improved by removal of nonhistoric additions. Overall,
21 historic buildings in the Muir Woods National Monument Historic District would be
22 preserved resulting in long-term, negligible, beneficial impacts.

23 The majority of the historic rustic Hillwood Camp buildings would be retained, and the
24 Muir Woods Addition area (including Camino del Canon, Conlan Avenue, and Druid
25 Heights areas) would be managed to provide trail opportunities and restore native habitat
26 and processes with emphasis on stabilizing any historic buildings. Thus, although the
27 buildings in the Muir Woods Addition area (including the Camino del Canon, Conlan
28 Avenue, and Druid Heights areas) would be evaluated under National Register of
29 Historic Places criteria, the majority of the buildings in the area that were determined
30 eligible for listing in the national register would be stabilized under this alternative
31 resulting in long-term, negligible, beneficial impacts.

32 **Conclusion**

33 Historically-significant buildings in the Muir Woods National Monument Historic
34 District would be rehabilitated and adaptively used to support visitor programming and
35 services. The historic buildings within the Muir Woods Addition that are eligible for
36 listing in the national register of Historic Places would be stabilized and all other
37 buildings would be removed. The overall impact to historic buildings under this
38 alternative would result in long-term, negligible, beneficial impacts.

39 Under this alternative, the Section 106 determination of effect on historic buildings in
40 Muir Woods National Monument would be *no adverse effect*.

41 No impairment of Historic Buildings would result from this alternative.

1 **Cultural Landscape Resources**

2 ***No Action Alternative***

3 ***Analysis***

4 The cultural landscape of Muir Woods National Monument historically illustrated
5 characteristics of the National Park Service rustic style through design of buildings,
6 naturalistic design of trails and roads, use of natural stone for Redwood Creek
7 revetments, and a pervasive log motif applied to footbridges, signs, gates, benches, and
8 drinking fountains. Cultural landscape resources at Muir Woods, such as historic trails
9 and roads (Main [Bootjack] Trail, Service Drive [Old Muir Woods Road], Fern Creek
10 [Fern Canyon] Trail, Camp Alice Eastwood Trail/Wagon Road, Ocean View Trail,
11 Bohemian Grove Trail, Hillside Trail, Ben Johnson Trail, Dipsea Trail, and Dipsea [Deer
12 Park] Fire Road), along with five bridges on the Main, Fern Creek, and Ben Johnson
13 trails have been afforded preservation treatment and maintained for visitor use and
14 enjoyment. Although some of the historic CCC-constructed erosion-control structures
15 have collapsed or been broken up to restore salmon habitat, an extensive system of stone
16 revetments along Redwood Creek has been maintained and remains in place. Historically
17 significant memorials, including those for Gifford Pinchot, William Kent, Franklin D.
18 Roosevelt, and Ralph Waldo Emerson, as well as the Redwood Cross Section Interpretive
19 Pavilion, have been afforded preservation treatment and maintained.

20 While overall the landscape retains its historic natural appearance, including the redwood
21 forest groves (Redwood Forest, Bohemian Grove, and Cathedral Grove), trails, and stone
22 revetments, the loss of several rustic buildings, most of the log footbridges, and virtually
23 all of the small-scale features has somewhat altered the monument's historic rustic
24 design. Although preservation treatment of vestiges of the cultural landscape is ongoing
25 as opportunities arise, such efforts have resulted in selected preservation as well as well
26 as loss of some resources and deterioration of others during recent decades, overall the
27 resources and actions described above result in mostly long-term, negligible and
28 beneficial impacts and some individual impacts that are minor and adverse.

29 The park staff works to preserve cultural landscapes that have integrity. As the National
30 Park Service understanding of cultural landscape resources evolve, the park staff would
31 continue to work in preserving landscape resources that retain their integrity. For
32 instance, although the significance of the cultural landscape values in the immediate area
33 of Druid Heights has not been evaluated or determined, as the park staff learns more
34 about this resource the significance of some resources may increase and such resource
35 values would be preserved.

36 ***Conclusion***

37 The cultural landscape of Muir Woods National Monument historically illustrated
38 characteristics of NPS rustic style. Overall the cultural landscape at Muir Woods National
39 Monument retains its historic natural appearance, and preservation treatment of cultural
40 landscape features is ongoing as opportunities arise resulting in mostly long-term,
41 negligible and beneficial impacts and some individual impacts that are minor and
42 adverse.

1 Under this alternative, the Section 106 determination of effect on cultural resource
2 features is *no adverse effect*.

3 No impairment of Cultural Landscape Resources would result from this alternative.

4 ***Alternative 1: Connecting People with the Parks***

5 ***Analysis***

6 Alternative 1 would retain much of the monument historic and natural cultural landscape
7 setting; including the present system of trails through the forest, and existing facilities.
8 Only some of the uses would be relocated to reduce their impacts on the ecosystem and
9 provide a more natural park experience. The Ben Johnson, Fern Creek, Main, and Dipsea
10 trails would be afforded preservation treatment and used to provide visitors with access to
11 a variety of day and overnight recreational experiences. New elements would be
12 introduced to the cultural landscape, such as new restrooms and drinking water facilities
13 in the Redwood Creek corridor. The overall impact would be negligible, and beneficial.

14 ***Conclusion***

15 This alternative would retain most of the current monument's historic and natural cultural
16 landscape. There would be some new facilities introduced to the cultural landscape
17 features, such as restrooms and drinking water facilities in the Redwood Creek corridor.
18 The overall impact would be negligible, and beneficial.

19 Under this alternative, the Section 106 determination of effect on cultural landscape
20 resources in Muir Woods National Monument would be *no adverse effect*.

21 No impairment of Cultural Landscape Resources would result from this alternative.

22 ***Alternative 2: Preserving and Enjoying Coastal Ecosystems***

23 ***Analysis***

24 Under alternative 2, the cultural landscape resources would be sublimated to natural
25 resource restoration goals and objectives. The majority of the built environment,
26 including cultural landscape resources and historic structures, such as the CCC-
27 constructed stone revetment erosion-control structures in Redwood Creek, would be
28 removed in restoration of the natural resources and floodplain systems. The historic trail
29 system throughout the monument would be redesigned to a more pristine setting that
30 emphasized natural resource preservation of the historic redwood groves (including the
31 Redwood Forest, Bohemian Grove, and Cathedral Grove), and various historic trails and
32 bridges would be removed, relocated, or redesigned to strengthen the natural conditions.
33 Where not in conflict with natural resource goals, cultural landscape features would be
34 preserved. SHPO narrative Need to discuss how to describe the impact and impairment.

35

36 ***Conclusion***

37 To more fully restore the primeval character and natural conditions of the monument
38 virtually all of the cultural landscape features and historic structures (including those yet
39 to be evaluated in the Muir Woods Addition area) would be removed under this
40 alternative. However, preservation of cultural landscape features, such as the historic

1 redwood groves (Redwood Forest, Behemian Grove, and Cathedral Grove) would be
2 enhanced. SHPO narrative Need to discuss how to describe the impact and impairment.

3 Under this alternative, the Section 106 determination of effect on cultural landscape
4 resources in Muir Woods National Monument would be *adverse effect*.

5 No impairment of Cultural Landscape Resources would result from this alternative.

6 **Alternative 3: Focusing on National Treasures – NPS Preferred**
7 **Alternative**

8 **Analysis**

9 In alternative 3, Muir Woods National Monument would be presented to visitors as a
10 contemplative outdoor museum where visitors would experience and discover the
11 primeval forest ecosystem (including the preserved Redwood Forest, Behemian Grove,
12 and Cathedral Grove) and the monument’s place in the history of the American
13 conservation movement. Accordingly, the majority of historic cultural landscape resource
14 features associated with those themes would be preserved and adaptively used to support
15 visitor programming and services, and the overall integrity of the monument’s cultural
16 landscape features would be preserved as part of the greater Muir Woods natural
17 ecosystem.

18 New trails would be constructed, while some historic trails would be rehabilitated and
19 others could be relocated or redesigned. Selected portions of the CCC-constructed
20 erosion-control stone revetments in Redwood Creek would be removed, while other
21 portions of the revetments would be preserved and interpreted. The overall impact would
22 be negligible, and beneficial.

23 **Conclusion**

24 Implementation of this alternative would provide for the most comprehensive retention,
25 preservation, and condition improvements to cultural landscape resources and historic
26 structures in Muir Woods National Monument. Although implementation of this
27 alternative would result in some localized adverse impacts to cultural landscape
28 resources, the impacts of this alternative would preserve the overall integrity of the
29 monument’s cultural landscape resources. Thus, the overall impacts of this alternative on
30 cultural landscape resources would be negligible, and beneficial.

31 Under this alternative, the Section 106 determination of effect on cultural landscape
32 resources in Muir Woods National Monument would be *no adverse effect*.

33 No impairment of Cultural Landscape Resources would result from this alternative.

34

35

1 **Museum Collections**

2 The alternatives for Muir Woods National Monument's museum collections are cover
3 under the environmental consequences for Actions Common to All Action Alternatives
4 and by each alternative for Golden Gate National Recreation Area.

5

6 **VISITOR USE AND EXPERIENCE**

7 **No Action Alternative**

8 ***Analysis***

9 The primary visitor activities of hiking through the redwood forest and enjoying the
10 sights and sounds of Muir Woods National Monument would continue in this alternative.
11 The existing interpretive programs would also continue. In addition, visitors would still
12 have some opportunities for self-discovery, which is a valued characteristic of visiting the
13 monument. During scoping for the plan, there were some mentions of additional
14 recreation opportunities that were desired including more trail access to the Camino del
15 Canon area and with connections to the surrounding state park lands. In this alternative,
16 the Camino del Canon area would remain largely inaccessible to most visitors and no
17 additional trail connections would be established with adjacent public lands. Visitors
18 have also expressed interest in more diverse interpretive programs and this alternative
19 would not include additional programming or educational facilities to support
20 programming. The lack of some of these desired improvements would be a long-term,
21 moderate, adverse impact on those visitors seeking these opportunities.

22 The monument continues to provide some opportunities for solitude, quiet and
23 connection with the primeval forest. These characteristics of the park's visitor
24 opportunities are highly valued by the public. This alternative would continue to promote
25 these values, including encouraging modification of visitor behavior through strategies
26 such as quiet zones and quiet days to minimize impacts on the natural soundscape.
27 However, a large number of visitors have expressed concerns about the amount of noise
28 and crowding that still occurs during peak times, especially when groups are present in
29 the woods.

30 Visitors would continue to have access to the monument via private automobile as well as
31 the park shuttle during the peak season. The shuttle has improved access options to the
32 monument and eased some of the congestion on surrounding access roads, a long-term,
33 moderate, beneficial impact. However, there is still concern about the amount of informal
34 parking that is occurring at the monument, and the amount of congestion from vehicles,
35 buses, and pedestrians competing for the same space at the monument entrance. These
36 issues result in a long-term, moderate, adverse impact on the visitor experience.

37 Visitor safety at the monument is considered to be good in the no action alternative,
38 except for the safety concerns associated with informal parking along the entrance road
39 during peak visitation. The real and perceived safety problems associated with informal
40 parking will continue in this alternative resulting in a long-term, minor, adverse impact.

41

1 **Conclusion**

2 The no-action alternative would result in long-term, minor to moderate, beneficial
3 impacts from continued opportunities to experience the unique and highly valued
4 characteristics of the primeval forest via hiking trails and educational programs. These
5 activities and experiences are highly valued by visitors. However, minor to moderate
6 adverse impacts on the visitor experience from visitor crowding, noise, and informal
7 parking during peak times would continue.

8

9 **Alternative 1: Connecting People with the Parks**

10 **Analysis**

11 Alternative 1 would provide for self-discovery in a natural park setting while making
12 connections to a wider array of opportunities on adjacent public lands. Some additional
13 programming and enhanced facilities would give visitors new means to understand the
14 conservation history and primeval forest ecosystem. Additional trail and overnight
15 opportunities in the Camino del Canon area would also allow for new visitor
16 opportunities. All of these actions would expand the range of activities for visitors and
17 allow them to better understand the important stories of the monument. These actions
18 would provide visitors with a long-term, minor to moderate, beneficial impact on their
19 use and experience.

20 The monument would continue to welcome a diversity of visitors and support a range of
21 recreation activities. New recreation activities would largely be focused on new
22 interpretive, educational and stewardship activities that would be staged at the
23 Administration-Concession Building and in the Camino del Canon area. Also, visitors
24 would be introduced to ways of accessing adjacent landscapes and recreational
25 opportunities of surrounding public lands, creating a more seamless connection to the
26 diversity of day and overnight recreation opportunities in the surrounding area.

27 Visitors would be provided a variety of programs and opportunities in exploring the
28 natural and conservation themes throughout the monument, appealing to many learning
29 styles and increasing the breadth of stories being told. Interpretation on the shuttle bus
30 would orient visitors and allow them to better plan their visit. Expanded structured
31 educational opportunities by park staff and partners would also add to the learning
32 opportunities available to visitors. This would include new overnight educational
33 opportunities in the Camp Hillwood area. Improved learning opportunities were highly
34 desired by some members of the public. These added interpretive and educational
35 programs would have a long-term, minor to moderate, beneficial effect to the visitor
36 experience.

37 Alternative 1 would allow visitors improved access to the monument during peak times
38 by providing increased shuttle service and a more convenient shuttle stops. The increased
39 shuttle access to the woods would reduce traffic congestion at the park entry, minimizing
40 visitor frustration and conflicts on arrival. However, some visitors may experience
41 adverse effects if they are not able to board the shuttle in a timely manner. Visitors who
42 would prefer to park at the monument to maintain flexibility in their schedule would also
43 be adversely affected by the proposed reduction in parking at the monument. Within the

1 monument, visitor access would be improved and congestion reduced through greater
2 dispersion of visitors, new facilities, and accessible trails. This would include upgrades to
3 trails for purposes of accessibility and resource protection, along with water and restroom
4 facilities at Bridge 4. The above actions would result in long-term, moderate, beneficial
5 impacts.

6 The monument's natural setting and its primary natural resource would be enhanced by
7 reconfiguring parking away from the entrance to the primeval redwood forest and
8 restricting parking along the road to the monument. Pulling vehicle circulation away from
9 the monument would also improve the natural soundscape. Implementation of a quiet
10 zone would allow visitors to understand the value that is placed on the natural quiet of the
11 forest and encourage visitors to help provide a quiet and contemplative experience for all.
12 These actions would have a long-term, moderate, beneficial impact on the visitor
13 experience at Muir Woods National Monument.

14 Because of the efforts made to improve the safety of the circulation system and parking at
15 the monument, visitor safety would be improved. The potential for pedestrian and
16 vehicular conflicts would be reduced as well as conflicts between vehicles.

17 **Conclusion**

18 Under alternative 1, impacts to the visitor experience would be long term, minor to
19 moderate, and beneficial. The improvements to the arrival experience to the park, along
20 with enhanced educational and interpretive opportunities, directly address the primary
21 interests and concerns of most visitors to the monument. It is likely that a similar number
22 of visitors could be accommodate in this alternative while still meeting desired conditions
23 given the ability to better disperse and manage visitation on the park shuttle and trails, a
24 long term minor beneficial impact.

25

26 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

27 **Analysis**

28 Alternative 2 would restore the primeval character of the old-growth forest and the visitor
29 experience would be more primitive than it is today. The majority of the built
30 environment would be removed and only light-on-the-land trails would reach into the
31 heart of the forest. While the range of activities would be limited, the experience of the
32 primeval forest would be heightened; benefiting visitors that are interested most in the
33 natural ecological processes of the forest and creek.

34 Visitors would still have opportunities to enjoy the primary recreation activity of the
35 monument, hiking through the forest. The experience along the trail setting would be
36 improved with less encounters with others and more emphasis on connection with the
37 surrounding natural environment. Visitors would also have opportunities for educational
38 and stewardship programs focused on exploring the redwood forest ecology and the
39 conservation of Muir Woods National Monument. Participatory programs would
40 encourage a deeper and more meaningful understanding of the forest. Interpretation on
41 the shuttle bus would orient visitors and allow them to better plan their visit. This
42 alternative provides a different visitor experience than the no-action alternative. If

1 managed well, the alternative 2 could result in a long-term, moderate, beneficial visitor
2 experience where visitors have a more hands-on interaction with the primeval redwood
3 forest.

4 The full-time shuttle access to Muir Woods National Monument will reduce traffic
5 congestion at the park entry, minimizing visitor frustration and conflicts on arrival; a
6 long-term, moderate, beneficial impact. However, there would be long-term, moderate,
7 adverse effects for those that cannot get on the shuttle in a timely manner. Some visitors
8 who would prefer to park at the monument would also be adversely affected by the
9 substantial reduction in parking. Additionally, the restriction on tour bus access would
10 make access for tour groups less convenient.

11 The park setting would be restored to a more naturalistic setting, with few indications of
12 built structures. All structures would be moved out of the woods, giving visitors more
13 natural views and soundscapes. The removal of all parking except for a small
14 accessible lot would increase the naturalness of the arrival area to Muir Woods National
15 Monument. It also would reduce the noise and pollution caused by personal vehicles and
16 tour buses.

17 Because of the efforts made to improve the safety of the circulation system and parking at
18 the monument, visitor safety would be improved. The potential for pedestrian and
19 vehicular conflicts would be reduced as well as conflicts between vehicles. The increased
20 rustic nature of the trail system may slightly increase the potential for safety incidences, a
21 potential adverse impact.

22 **Conclusion**

23 Alternative 2 would result in long term, minor to moderate, beneficial impacts to the
24 visitor experience, primarily due to enhancements to the monument's natural setting and
25 the promotion of a more authentic and connected visitor experience with the primeval
26 forest. However, long term, minor to moderate, adverse impacts to the visitor experience
27 would also occur, since some visitors would likely find it challenging to visit given the
28 lack of parking and support facilities, and the increased regulation of visitor access. Also,
29 it is likely that alternative 2 would not further encourage use of the monument by diverse
30 groups given more limited visitor opportunities and services. It is likely that a smaller
31 number of visitors could be accommodated in this alternative given more limited
32 facilities and the emphasis on less visitor encounters in the woods, a long term minor
33 adverse impact.

34

35 **Alternative 3: Focusing on National Treasures**

36 **Analysis**

37 Alternative 3 is the NPS preferred alternative and would present Muir Woods National
38 Monument as a contemplative outdoor museum where visitors would explore and
39 understand the primeval forest and the monument's place in American conservation
40 history. Visitors would have greater diversity of recreational opportunities, along with
41 multiple types of educational and stewardship opportunities provided to reach a more
42 diverse audience with various learning styles.

1 Existing recreation activities would largely continue, along with the addition of thematic
2 trails within the heart of the woods. There would also be new trail opportunities in
3 Camino del Canon. Other new opportunities would involve increased stewardship and
4 educational programs that allow visitors first-hand experience in the “living museum” of
5 the monument. The use of the administration-concessions building in the woods for
6 expanded programs and research would allow for a wider range of recreation and
7 learning opportunities. The park staff would be focused on facilitating improved
8 understanding of park values to a broad audience. New and diverse learning opportunities
9 were highly desired by some members of the public. Investment in new and
10 comprehensive on-site interpretive and educational programs would expand the visitor
11 opportunities and understanding of the monument’s resources and thereby effect long-
12 term, moderate, beneficial impacts on the visitor experience.

13 The preferred alternative would allow visitors improved access to the monument during
14 peak times by providing increased shuttle service and more convenient shuttle stops. The
15 increased shuttle access to Muir Woods National Monument would reduce traffic
16 congestion at the park entry, minimizing visitor frustration and conflicts on arrival; a
17 long-term, moderate, beneficial impact. However, there would be long-term, moderate,
18 adverse effects for those that cannot get on the shuttle in a timely manner. Some visitors
19 who would prefer to park at the monument would also be adversely affected by the
20 partial reduction in parking.

21 Within the monument, visitor access would be improved and congestion reduced through
22 greater dispersion of visitors on thematic trails and within the newly opened Camino del
23 Canon area. However, some areas that would be zoned for sensitive resources would
24 have reduced or more controlled visitor access. Camp Hillwood would be used for walk-
25 in day use programs and thereby restrict access for existing overnight group
26 opportunities.

27 Viewsheds and soundscapes at the monument would be improved in the preferred
28 alternative. Visitors would experience a more natural setting upon arrival at the
29 monument as a result of the reconfiguration of the parking lots. Dispersal of visitors
30 among thematic trails and within the Camino del Canyon area would improve both the
31 soundscapes and viewsheds, as fewer people would be in any one place at any one time.
32 Soundscape management practices would also improve the soundscape. Overall, the
33 above actions would have a long-term, moderate, beneficial impact to the visitor
34 experience.

35 Because of the efforts made to improve the safety of the circulation system and parking at
36 the monument, visitor safety would be improved. The potential for pedestrian and
37 vehicular conflicts would be reduced, as would the potential for conflicts between
38 vehicles.

39 **Conclusion**

40 Actions proposed in the NPS preferred alternative would result in long term, minor to
41 moderate, beneficial impacts to the visitor experience. This alternative contributes to the
42 purpose of the monument by providing high quality recreation and education
43 opportunities that welcome a wide audience to experience and understand the most
44 important resources and stories of Muir Woods National Monument. It is likely that a

1 reasonably large number of visitors could be accommodated in this alternative while still
2 meeting desired conditions, given the ability to better disperse and manage visitation on
3 the park shuttle and trails, a long-term, minor, beneficial impact.

4

5 **SOCIAL AND ECONOMIC ENVIRONMENT**

6 **No Action Alternative**

7 **Analysis**

8 As detailed in the “Social and Economic Environment” section of Part 8, parklands such
9 as Muir Woods National Monument are integral in sustaining a high quality of life in a
10 highly urbanized community such as the Bay Area. The no-action alternative for the
11 national monument would continue to provide open space, a wildland experience, and
12 public access, while maintaining a nationally-significant natural resource. As other Bay
13 Area private land continues to develop and urbanize into the future, Muir Woods
14 National Monument will become exponentially more valuable to the community and its
15 quality of life. This results in an impact that is long-term, moderate, and beneficial in the
16 context of the local gateway communities in Marin County. The impact would be long-
17 term, minor, and beneficial for the overall three adjacent counties and the nine-county
18 Bay Area region.

19 A rather unique impact of the no-action alternative on Bay Area community and quality
20 of life results from how this alternative may not effectively address the issue of minority
21 group disenfranchisement from Muir Woods National Monument. The no-action
22 alternative would continue a modest NPS public outreach and orientation program. With
23 an expected large numeric and percentage increase in minority populations in Marin
24 County over the next 20 years, a large and rapidly-growing segment of the region’s
25 population could benefit from a more concerted and collaborative NPS effort in reaching
26 the new, more diverse audiences. As explained in the Social and Economic Affected
27 Environment section, studies have indicated that several segments of the Bay Area
28 population (primarily racial and ethnic minorities) may feel disconnected from the park.
29 Several explanations such as language barriers, cultural differences, and lack of
30 identifying with park staff were given as contributing factors. The no-action alternative
31 would not actively address this issue, at least not to the degree that may be necessary in
32 the future. Thus, under the no-action alternative, this community disconnection problem
33 may worsen over the next 20 years due to the anticipated population trends. As a result,
34 the no-action alternative may result in an impact that would be long-term, minor to
35 moderate, and adverse for the local gateway communities and the three adjacent counties.

36 The education and stewardship opportunities for the residents would be maintained, and
37 possibly improved as resources become available. Fostering a conservation ethic among
38 local residents and visitors would continue to be key component of these programs. As a
39 result, the existing programs would continue to enhance the quality of life for a number
40 of local residents. This results in an impact that is long-term, minor, and beneficial in the
41 context of the local gateway communities and three adjacent counties.

1 Under the no-action alternative, the National Park Service would continue to collaborate
2 with other local land managers and local governments to maintain its “watershed
3 approach” to land management. With this continuing objective, the NPS actions can
4 further enhance the quality of life by maintaining productive and effective relationships
5 with other agencies and organizations throughout Marin County and possibly beyond.
6 This results in a communitywide, and perhaps regionwide, effort for wildland protection,
7 which ultimately would benefit the quality of life for local residents. This collaboration
8 would also continue to improve community awareness and engagement in park and
9 regional issues. As a result, the impact would be long-term, minor to moderate, and
10 beneficial in the context of the local gateway communities, and to some extent, the three
11 adjacent counties.

12 In terms of effects on the local economy, the no-action alternative for Muir Woods
13 National Monument would maintain the current levels of NPS jobs, concessionaires, NPS
14 operations spending, and contract work, with occasional site-specific or program-specific
15 improvements as funding becomes available. The value of these attributes to the local
16 economy is discussed in the Social and Economic Affected Environment section. The no-
17 action alternative would result in a negligible change from current conditions in impact to
18 the local economy in the future. However, as with all other alternatives, the no-action
19 alternative would maintain Muir Woods National Monument’s overall intrinsic
20 contribution to the local economy in the Bay Area. By continuing to provide open space
21 preservation, recreation opportunities, and an aesthetic natural backdrop, the national
22 monument would continue to help make the Bay Area a place for companies and talented
23 professionals to call home. In other words, the Bay Area’s quality of life becomes a draw
24 for business and economic growth with the help from places like Muir Woods National
25 Monument. The no-action alternative will sustain and enhance this economic value to the
26 Bay Area. This results in an impact that is long-term, moderate, and beneficial in the
27 context of the local gateway communities in Marin County. The impact would be long-
28 term, minor to moderate, and beneficial for the adjacent three counties and long-term,
29 minor, and beneficial for the overall Bay Area region.

30 **Conclusion**

31 In the context of the local gateway communities and the three adjacent counties, the
32 beneficial impacts to the social and economic environment from the no-action alternative
33 would be long-term and minor to moderate. The beneficial impacts could result from
34 maintaining the park’s contribution to the local economy and quality of life, existing
35 education and stewardship programs, as well as maintaining collaborative efforts with
36 several local governments and land managers. The adverse impacts to the social and
37 economic environment of the gateway communities and three adjacent counties could be
38 long-term and minor to moderate. These impacts could result from not effectively
39 reaching or connecting with the diverse Bay Area population, thus not strengthening
40 opportunities for enhancing the quality of life for a large and growing segment of the
41 region’s population.

42

43

1 **Alternative 1: Connecting People with the Parks**

2 **Analysis**

3 The public outreach, welcoming, and orientation focus of alternative 1 would contribute
4 to the quality of life of many Bay Area residents and communities. Improved orientation,
5 outreach, and support facilities that would be aimed at reaching the diverse populations of
6 the Bay Area could connect with local residents who previously felt disengaged with park
7 sites such as Muir Woods National Monument. This “welcoming outreach” for Bay Area
8 residents would be complemented with improved visitor welcoming center facilities at
9 key locations. Also, this alternative includes an improvement in park accessibility via an
10 expanded shuttle bus service that connects with local and regional transportation systems
11 in Marin County. The shuttle bus service will contribute to an improved quality of life in
12 the community by allowing more local residents to access the park (e.g., those without
13 personal vehicles), and by reducing traffic congestion on local and regional roads. All of
14 these efforts would improve the quality of life of more Bay Area residents by exposing
15 them to the health, education, and recreation benefits of visiting Muir Woods National
16 Monument and other park sites. Thus, the mission of alternative 1, “Connecting People
17 with the Parks” would inherently raise quality of life in the local communities of the
18 gateway counties since park use has so many positive social, physiological, and
19 psychological effects on people. This could result in an impact that is long-term, minor to
20 moderate, and beneficial in the context of the local gateway communities and three
21 adjacent counties. The impact to the overall Bay Area would be long-term, minor, and
22 beneficial.

23 The strong component of community outreach, welcoming, and orientation under
24 alternative 1 could increase participation of a more diverse audience that includes racial
25 minorities and lower income bracket residents. As described in the Visitor Experience
26 and the Social and Economic sections of the Affected Environment, the Bay Area
27 consists of a very diverse population of many races and cultures. And, many of the racial
28 and ethnic groups in the Bay Area do not feel connected with park sites such as Muir
29 Woods for several reasons (e.g., language barriers, cannot identify with park staff due to
30 cultural differences). This issue could be compounded by the substantial population
31 increase of these minority groups that is projected over the next 20 years. The actions
32 included in “alternative 1: Connecting People with the Parks” would help the NPS build a
33 connection and relationship with these segments of the Bay Area population. This may
34 result in more racial and ethnic groups in the Bay Area visiting the monument and being
35 more active and engaged in natural and cultural resource issues. The impact of alternative
36 1 on the population demographic would be long-term, minor to moderate, and beneficial
37 for the local gateway communities, the three adjacent counties, as well as the overall Bay
38 Area.

39 In addition, alternative 1 includes a variety of construction projects that would support
40 the local economy by offering new contract work for local and regional firms. Most of
41 these park projects would be associated with the improved visitor welcoming facilities
42 that would complement the NPS’s effort at welcoming and orienting people at Muir
43 Woods National Monument. The projects would include the new welcome centers at
44 shuttle pick-up points, new restrooms at Bridge 4, the removal of nonessential /

1 nonhistoric structures, a redesigned entry road and entry area, and the upper parking lot
2 removal. These projects would generate new contract work for private firms in the Bay
3 Area, including engineering consultants, construction contractors, and environmental
4 consultants. These projects would not only support these contracting businesses and their
5 employees directly, but the economic multiplier effect would circulate this contract
6 money through the local economy. This phenomenon is explained in the Social and
7 Economic Affected Environment section. The collective result of these actions would be
8 impacts that are short-term, minor, and beneficial for local gateway communities and
9 possibly the three adjacent counties.

10 Alternative 1 would likely result in increased park visitation and thereby has a beneficial
11 influence on the local economy. Given the very large population center at the doorstep of
12 Muir Woods National Monument, the conditions are ripe for a notable increase in park
13 visitation if the NPS increases its public outreach efforts (as proposed in this alternative).
14 This potential is particularly significant for the minority groups of the Bay Area, which
15 historically have not fully connected with park sites such as this. If the NPS improves its
16 connection with these population segments, the park could realize a considerable increase
17 in visitation given the large and increasing percentage of racial minorities in the Bay
18 Area. When the visitation at Muir Woods National Monument increases, several direct
19 and indirect economic benefits would result. First, the park would see an increase in
20 revenue, which may fund future park improvement work and contracts, which will have
21 multiplier effects on the local economy. Secondly, as more visitors travel to the national
22 monument, they would spend money at the many local businesses and concessionaires in
23 Marin County (e.g., eateries, hotels, services, etc.). This increased revenue would directly
24 support the local businesses and their employees. In addition, this money would
25 eventually circulate further through the Bay Area economy due to the multiplier effect
26 and possibly lead to more economic growth in the gateway communities (as additional
27 revenue monies move through the local economy). This possible money inflow into the
28 local economy could result in an impact that is long-term, moderate, and beneficial for
29 local gateway communities. Impacts to the three adjacent counties would be long-term,
30 minor, and beneficial.

31 The need for some new NPS or concessionaire staffing may also be generated at the new
32 welcome centers to provide new visitor services. The expanded shuttle bus services could
33 also generate additional concessionaire jobs. These new jobs may result in an impact that
34 is long-term, minor, and beneficial to the local gateway communities in Marin County.
35 Impacts to the three adjacent counties would be negligible.

36 Lastly, alternative 1 includes an action that expands the shuttle bus service to the park
37 and connects the shuttle with local and regional transportation systems. With the
38 possibility of less park visitors accessing the park via personal vehicles because of this
39 service, the potential exists for a reduction in local business activity in the Marin County
40 communities (since those in personal vehicles can more readily access local sites and
41 business while en route to the park). Therefore, the shuttle bus program could have a
42 negative effect on the local economy. This loss in business would also have secondary
43 negative effects on the local economy due to the reduction of the multiplier effect of the
44 business revenues that would no longer be circulating further through the local economy.
45 This action may result in an impact that is long-term, minor, and adverse to the local

1 gateway communities in Marin County. Impacts to the adjacent three counties would
2 likely be negligible.

3 **Conclusion**

4 The overall beneficial impact to the social and economic environment from alternative 1
5 would be short-term to long-term, and range from minor to moderate for the local
6 gateway communities and the three adjacent counties. As for the overall Bay Area, the
7 beneficial impacts would be long-term, minor, and beneficial. The beneficial impacts
8 would primarily result from: (1) a significant increase in public outreach programs,
9 visitor orientation, and new welcoming facilities at the park, (2) improved connections to
10 local and regional transportation systems and less traffic congestion in the community,
11 (3) an increase in NPS effort at reaching out to the large population of racial minorities
12 and individuals from lower income brackets in Marin County and beyond, (4) various
13 new engineering and construction contracts for facility improvement projects, (5)
14 possible increased park revenues and increased spending at local businesses from an
15 anticipated increase in park visitation due to active public outreach and welcoming
16 efforts, and (6) job creation from the proposed increase in visitor services in the park and
17 the shuttle service expansion.

18 The adverse impacts of alternative 1 could be long-term and minor in the context of the
19 local gateway communities. The adverse impacts could result from the possible reduction
20 in local business activity from park visitors who opt for public transit and the park
21 shuttle.

22

23 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

24 **Analysis**

25 Since alternative 2 places a priority on ecological restoration, recreational opportunities
26 in the park may be somewhat reduced for local residents. This may slightly reduce the
27 amount of exercising, learning, and/or recreating in the local communities. However,
28 given the availability of other recreation sites in the immediate proximity of Marin
29 County, this adverse impact to quality of life would likely be negligible and very
30 localized.

31 Alternative 2 includes a significant change in park accessibility. With this alternative, all
32 visitors would come to the park via their own power (e.g., bike, walk), or via an
33 expanded shuttle bus service that connects with local and regional transportation systems.
34 The shuttle bus program will contribute to an improved quality of life by allowing more
35 local residents to access the park (e.g., those without personal vehicles), and by reducing
36 traffic congestion on local and regional roads in Marin County. This transportation
37 change may result in an impact that is long-term, minor, and beneficial for the local
38 gateway communities in Marin County. The impact to the overall three adjacent counties
39 would likely be negligible.

40 Also, this alternative does not place a high priority on community outreach and
41 welcoming (as in alternative 1). Thus, various segments of the diverse Bay Area
42 population may not be effectively reached or actively welcomed to Muir Woods National

1 Monument. Thus, this alternative would not maximize the potential quality of life
2 improvement for a large segment of the community's population. As the minority
3 population in the Bay Area grows significantly over the next 20 years (in number and in
4 percentage), this may result in an impact that is long-term, minor to moderate, and
5 adverse in the context of the local gateway communities, the three adjacent counties, as
6 well as the overall Bay Area.

7 The focus on restoration of habitat connections may increase opportunities and reasons
8 for local government land managers to preserve land in vicinity of the national monument
9 (to establish public land connections and reduce further habitat fragmentation). If the
10 adjacent local land managers pursue additional open space around Muir Woods in Marin
11 County, the local residents of the area may have additional park recreation sites to visit in
12 the future. This would enhance the quality of life for residents of the area. The impact
13 would be long-term, minor, and beneficial for the local gateway communities. Impact to
14 the adjacent three counties would be negligible.

15 As for impacts to the local economy, since alternative 2 focuses on preserving ecological
16 resources, several actions in this alternative aim at restoring and reclaiming natural
17 features in and around Muir Woods National Monument. These reclamation efforts
18 would necessitate various types of construction projects (e.g., structure removal,
19 earthwork) that would support the local economy by offering new contract work for local
20 and regional firms. The projects would include the removal of several buildings, parking
21 lots, trails, and roads, and the relocation of water and sewer systems. Environmental
22 restoration work would follow these facility removals and relocations. All of these
23 projects could generate new contract work for private firms in the Bay Area, including
24 engineering consultants, construction contractors, and environmental consultants. These
25 projects would not only support these contracting businesses and their employees
26 directly, but the economic multiplier effect would circulate this contract money through
27 the local economy. This phenomenon is explained in Chapter 3, in the Social and
28 Economic Affected Environment section. The collective result of these actions would be
29 impacts that are short-term, minor, and beneficial for local gateway communities and
30 possibly the three adjacent counties.

31 Some new NPS or concessionaire staffing may be generated by the significant expansion
32 to the shuttle service to the park. These new jobs may result in an impact that is long-
33 term, minor, and beneficial to the local gateway communities in Marin County.

34 Lastly, alternative 2 would require that all national monument visitors access the park via
35 their own power (e.g., bike, walk) or via an expanded shuttle bus service that connects
36 with local and regional transportation systems. Thus, this action would reduce the number
37 of people traveling through Marin County via their personal vehicles. In terms of local
38 economic impact, this transportation shift would result in less business activity for local
39 business in Marin County since bus passengers cannot easily access local sites and
40 businesses while en route to the park (unlike those in personal vehicles). This loss in
41 business would also have secondary negative effects on the local economy due to the
42 reduction of the multiplier effect of the business revenues that would no longer be
43 circulating further through the local economy. This action may result in an impact that is
44 long-term, minor to moderate, and adverse to the local gateway communities in Marin

1 County. Impacts to the adjacent three counties would likely be negligible, or possibly
2 long-term, minor, and adverse.

3 **Conclusion**

4 The beneficial impacts to the social and economic environment from alternative 2 would
5 be short-term to long-term and minor for the local gateway communities and the three
6 adjacent counties. In the context of the Bay Area, the beneficial impacts would likely be
7 negligible. The beneficial impacts could result from (1) increased cooperation with other
8 local governments and land managers to pursue the preservation of additional publicly
9 accessible lands in the area, (2) contract work created by various reclamation projects, (3)
10 possible new jobs created by the significant expansion in the shuttle service that serves
11 the park, and (4) the expanded shuttle service that would allow more local residents to
12 access the park and reduce traffic congestion.

13 The adverse impacts from alternative 2 could be long-term, ranging from minor to
14 moderate for the local gateway communities, the three adjacent counties, as well as the
15 Bay Area. The adverse impacts could result from (1) the possible reduction in local
16 business activity from park visitors who would need to take public transit to the park, and
17 (2) a limited effort in reaching out to the diverse population of the Bay Area (as it will
18 likely become a more diverse, “minority-majority” population over the next 20 years.)

19

20 **Alternative 3: Focusing on National Treasures**

21 **Analysis**

22 Alternative 3 for Muir Wood National Monument includes actions that provide some new
23 visitor information and orientation, as well as interpretation programs that would be
24 aimed at bringing Bay Area residents to the park. These new programs may help reach
25 the diverse populations of the Bay Area, which may help the park connect with local
26 residents who previously felt disengaged with Bay Area park sites such as this. The
27 attempts to connect with local residents would be complemented with improved visitor
28 welcoming center facilities at Muir Woods National Monument access points. In
29 addition, alternative 3 includes an improvement in park accessibility via an expanded
30 schedule of shuttle bus connections with local and regional transportation systems. The
31 shuttle bus program could contribute to an improved quality of life by allowing more
32 local residents to access the park (e.g., those without personal vehicles), and by reducing
33 traffic congestion on roads in Marin County. Collectively, the above efforts could
34 improve the quality of life of more Bay Area residents by exposing them to the health,
35 education, and recreation benefits of visiting Muir Woods National Monument and other
36 park sites. This could result in an impact that is long-term, minor to moderate, and
37 beneficial in the context of the local gateway communities and three adjacent counties.

38 Alternative 3 places a strong emphasis on the national significance of Muir Woods
39 National Monument (natural and historical) and educating the public on this significance.
40 As the residents of Marin County and the Bay Area as a whole become more aware of the
41 uniqueness and importance of Muir Woods National Monument, they may develop a
42 stronger sense of pride or identity in the community in which they live. These personal

1 appreciation values and sense of community belonging can contribute to one's quality of
2 life. This identification with the unique resources of the community may yield an impact
3 that is long-term, minor, and beneficial in the context of the local gateway communities
4 and three adjacent counties.

5 This alternative includes some expansion of community outreach to improve the
6 connection with local residents. Given the large and growing population of the adjacent
7 metropolitan community, conditions exist for a notable increase in park visitation if the
8 NPS increases its public outreach efforts. This potential is particularly significant for the
9 minority groups of the Bay Area, which historically have not fully connected with park
10 sites such as Muir Woods National Monument. If the National Park Service improves its
11 connection with these population segments, the park could realize a considerable increase
12 in visitation. If the visitation increases, several direct and indirect economic benefits
13 would result. First, the park would see an increase in revenue, which may fund future
14 park improvement work and contracts, which will have multiplier effects on the local
15 economy. Secondly, as more visitors travel to Muir Woods National Monument, they
16 would spend more money at the many local businesses and concessionaires in Marin
17 County (e.g., eateries, hotels, services, etc.). This increased revenue would directly
18 support the local businesses and their employees directly. In addition, this money would
19 eventually circulate further through the Bay Area economy due to the multiplier effect
20 and possibly lead to more economic growth in the gateway communities (as additional
21 revenue monies move through the local economy). This possible money inflow into the
22 local economy could result in an impact that is long-term, minor to moderate, and
23 beneficial for local gateway communities. Impacts to the three adjacent counties would
24 be long-term, minor, and beneficial.

25 The new welcome centers proposed as part of alternative 3 could generate a need for new
26 NPS or concessionaire staffing to provide new or expanded visitor services at the national
27 monument. New concessionaire jobs could also be created by the expanded shuttle bus
28 services. This potential increase in jobs may result in an impact that is long-term, minor,
29 and beneficial in the context of the local gateway communities. Impacts to the three
30 adjacent counties would be negligible.

31 Lastly, alternative 3 would expand the shuttle bus service to the park. Since this shuttle
32 connects with local and regional transportation systems, many park visitors may choose
33 to leave their car at home and access the park via public transportation. If this happens,
34 local businesses in Marin County communities would experience a reduction in
35 customers and business activity since bus passengers cannot easily access local sites and
36 businesses while en route to the park (unlike those in personal vehicles). Therefore, the
37 shuttle bus program could have a negative effect on the local economy. This loss in
38 business would also have secondary negative effects on the local economy due to the
39 reduction of the multiplier effect of the business revenues that would no longer be
40 circulating further through the local economy. As a result, the impacts to the local
41 gateway communities in Marin County could be long-term, minor, and adverse. Impacts
42 to the adjacent three counties would likely be negligible.

43

1 **Conclusion**

2 The beneficial impacts of alternative 3 on the social and economic environment could be
3 long-term, ranging from minor to moderate for local gateway communities and the three
4 adjacent counties. Most of the effects on the Bay Area would likely be negligible given
5 the location and size of the Muir Woods National Monument, relative to the Bay Area.
6 However, the alternative 3 attributes that relate to community outreach and identifying
7 the national significance of Muir Woods National Monument may possibly generate
8 impacts that are long-term, minor, and beneficial to the overall Bay Area. Overall, the
9 beneficial impacts of alternative 3 could result from (1) a moderate increase in public
10 outreach, visitor orientation, and new welcoming facilities at the park, (2) improved
11 connections to local and regional transportation systems and less traffic congestion in the
12 community, (3) a modest number of possible jobs created by expanded visitor welcoming
13 services and expanded shuttle service, (4) a moderate increase in park revenues and
14 increased spending at local businesses from an anticipated increase in park visitation due
15 to active public outreach and welcoming efforts, and (5) the community's improved
16 awareness, pride, and appreciation of the national significance of Muir Woods National
17 Monument.

18 The adverse impacts of alternative 3 could be long-term and minor for the gateway
19 communities. The adverse impacts to the social and economic environment could result
20 from a reduction in local business activity due to a park visitors shifting from using
21 personal vehicles to using public transportation.

22

23 **TRANSPORTATION**

24 The analysis of transportation impacts in this section is based in part on four years of
25 studies of the Muir Woods Shuttle pilot program conducted for the County of Marin, and
26 the "Muir Woods Shuttle Alternatives" memo to park managers, dated August 2008. See
27 those documents for more details on the Muir Wood Shuttle operations, performance and
28 cost, and analysis of parking changes at Muir Woods National Monument.

29

30 **All of the Action Alternatives**

31 Recognizing the difficulty of accommodating the large number of visitors, all alternatives
32 move toward reducing the number of cars coming to the monument, and increasing the
33 proportion of visitors coming by transit. This latter objective is accomplished by both
34 increasing transit service and by intercepting travelers earlier in their trip so that more, if
35 not all, of the trip is on transit rather than by car. The following transportation-related
36 measures are incorporate in alternatives 1 through 3 for Muir Woods National
37 Monument. Although described independently, they should be considered parts of a
38 whole strategy, to be implemented in conjunction with each other.

39 A new offsite Welcome Center would be created in the vicinity of Highway 1 and US
40 101 where visitors would board the shuttle. The center would provide parking and would
41 be a transfer point to regional and local transit. The creation of the Welcome Center

- 1 would have a long-term, major, beneficial impact in improving transit facility capacity,
2 amenities and conditions.
- 3 Express transit service from downtown San Francisco and improved connections with the
4 regional ferry services would be pursued. This action is likely to result in a long-term,
5 moderate, beneficial impact to connectivity to Muir Woods, including number and
6 capacity of connections, and available modes of travel.
- 7 In Alternatives 1 and 3, shuttle service would be provided during shoulder and peak
8 periods as well as holiday weekends throughout the year. This would have a long-term,
9 moderate, beneficial effect by making transit service available on holidays during the
10 nonpeak period. In Alternative 2, service would run 365 days a year, which is likely to
11 have a long-term, major, beneficial impact on transit availability and an increase in
12 modes of travel to Muir Woods National Monument.
- 13 Parking at the monument would be reduced in Alternatives 1 & 3 and/or eliminated
14 (except for space needed for accessibility) in Alternative 2. Impacts of this are multi-
15 dimensional and are discussed below.
- 16 In all action alternatives, a main feature would be a reduction in or elimination of parking
17 capacity at the monument, offset by parking at one or more satellite lots, and increased
18 shuttle service. Parking at the Welcome Center would accommodate autos, while other
19 lots in the vicinity may be available to also accommodate visitors' cars. Some of the
20 satellite parking lots are also used by commuters during the week, so these may not be
21 available for shuttle passengers at that time unless they are reconfigured. By shifting the
22 majority of visitors to the San Francisco Express service, ferry passenger pick-up in
23 Marin County with the shuttle system, automobile congestion on local roads could be
24 expected to be reduced.
- 25 Taking the place of driving to the Muir Woods National Monument would be increased
26 transit service. The transit service would be the logical primary mode of access for
27 monument visitors, since potential for increased access by bicycle, on foot, or by tour bus
28 is limited. Continued reasonably convenient access is essential to maintain (and if
29 possible, enhance) a high-quality visitor experience.
- 30 The overall impacts of these measures would likely be a long-term, moderate to major,
31 beneficial effects on the functionality of the transportation system, with a moderate to
32 major increase in transit access from San Francisco, the Sausalito Ferry, and other points
33 in southern Marin County. There would be an increase in access by land- and water-
34 based regional transit, increased number and capacity of connections, and an increase in
35 the available modes of travel. Additionally, these measures could result in a long-term,
36 major, beneficial impact on connections, transit service availability, and transportation
37 facility capacity and amenities.
- 38 There would be a major, adverse impact on parking availability at the monument, offset
39 to a large degree by parking availability at off-site lots and increased transit. Visitors are
40 still likely to arrive by car from points west of the monument, which means that they
41 would have no opportunity to park and take transit. These visitors would be most affected
42 by the lack of parking, and their ability to visit the monument would be adversely
43 affected.

1 Establishing a visitor's Welcome Center with an off-site parking area, increasing transit
2 from both the Sausalito Ferry and San Francisco, to Muir Woods National Monument
3 would have a long-term, moderate to major, beneficial impact on the transit system
4 serving the monument. Reducing parking at the monument is also likely to have a long-
5 term, moderate to major, adverse impact on parking availability for visitors.

6

7 **No-Action Alternative**

8 **Analysis**

9 Currently, about 760,000 visitors per year travel to Muir Woods National Monument.
10 Visitation peaks during the summer months, particularly on weekends. Managing these
11 crowds and balancing the impact of the large number of visitors with the preservation of
12 the natural resources has been an ever-increasing challenge for park managers.

13 Muir Woods is reached on narrow two-lane roads that wind through canyons and over
14 Mount Tamalpais. There is little opportunity for passing, thus the roads are congested,
15 sometimes to the point of gridlock, on busy summer weekends. Marin County is
16 committed to keeping roads in West Marin at two lanes to preserve the rural character of
17 the area.

18 Most visitors arrive at Muir Woods National Monument by automobile. The monument
19 provides 179 parking spaces in three parking lots, supplemented by approximately 175
20 legal spaces along Muir Woods Road. Estimated demand for parking spaces on peak
21 season weekends in 2002 is 450 spaces (*Comprehensive Transportation Management*
22 *Plan, GGNRA, 2002*), a figure that exceeds the formal and informal parking capacity.
23 Parking on the roadway historically has extended to areas where parking is prohibited,
24 and there is minimal enforcement. Marin County has recently fenced off some of the
25 shoulder area, slightly reducing the number of available spaces. On busy weekends, cars
26 can be found parked along the road up to a mile from the monument. This can create
27 safety issues since people walk in the road to get to the monument, and the parked cars
28 make the navigable roadway narrower while also obscuring the view of pedestrians and
29 oncoming traffic.

30 A shuttle system was introduced in the summer of 2005. Originally, a three-year pilot
31 program the National Park Service has entered into a three-year partnership with the
32 County of Marin to jointly fund the service from 2009 through 2011, with the objective
33 of continuing the service into the future indefinitely. The shuttle runs on weekends and
34 holidays from May through September. Passengers board the shuttle in Sausalito, in
35 Marin City, or from two Park-and-Ride lots in Mill Valley. These satellite parking lots
36 are more than adequate to accommodate cars of shuttle riders on the weekends. More
37 than half of shuttle riders choose to take the shuttle because of changeable message signs
38 on Highway 101 informing them that the lot at Muir Woods is full, and directing them to
39 a shuttle stop.

40 Data gathered during the 2008 season shows that about 1 in 10 visitors to Muir Woods
41 National Monument took the shuttle on days when the shuttle was available. Ridership
42 has grown substantially each year of service, increasing farebox revenue and sometimes

1 requiring additional vehicles for the mid-day rush to the monument, and at the end of the
2 day.

3 In addition to the Muir Woods Shuttle, park management estimates that 20% of visitors
4 arrive by tour bus. With no further action taken, visitor connections to Muir Woods and
5 the functionality of the transportation system to the monument could experience a long-
6 term, moderate to major, adverse impact. Access roads to Muir Woods National
7 Monument would continue to be congested, slowing shuttle service, and making it
8 difficult for emergency vehicles to travel in the area. The existing parking lots at
9 monument are likely to continue to fill early in the day from May to September,
10 particularly on the weekends, and the unsafe roadside parking situation could also
11 continue. Shuttle service can be expected to see continued increases in ridership.

12 **Conclusion**

13 If no further monument related transportation actions are taken, circulation will likely see
14 a long-term, moderate to major adverse impact to visitor connections and the
15 transportation system.

16

17 **Alternative 1: Connecting People with the Parks**

18 **Analysis**

19 In addition to the actions common to all alternatives, alternative 1 includes the following
20 transportation-related actions for Muir Woods National Monument. It should be noted
21 that the transportation measures in Alternative 3 are identical to those in Alternative 1.

22 In addition to the off-site Welcome Center described above, the Monument's existing
23 entry area would be redesigned. Pedestrian access would be improved by separating
24 visitors from roads and parking. A modest facility would be provided to receive visitors
25 arriving by different modes of transportation including the shuttle. The entry area might
26 include such services as restrooms, orientation programs and information, food service,
27 and sheltered areas for passengers waiting for buses. This measure may have a long-term,
28 moderate, beneficial impact on transit facility capacity, amenities, and conditions.

29 In order to improve pedestrian safety and protect Redwood Creek, the monument would
30 collaborate with Marin County to restrict shoulder parking along Muir Woods Road in
31 non-trailhead areas when sufficient transit is available to meet visitation demand. **The
32 number of parking spaces on the road shoulders would not change from the present
33 number. This would have a long-term, moderate, beneficial impact on pedestrian access
34 to the monument.**

35 Parking at the monument would be reconfigured or relocated using sustainable design
36 practices to reduce impacts to the creek and other sensitive resources. Parking would be
37 decreased by an estimated 33%; capacity would meet demand during non-peak periods.
38 This is likely to have a long-term, minor, adverse impact on parking availability during
39 those times when the shuttle is not running.

40 Data from the Comprehensive Transportation Management Plan for Parklands in
41 Southwestern Marin (CTMP) indicates that off-peak and shoulder season typical

1 weekday parking demand at the monument ranges between 115 and 155 spaces. By 2023
 2 this is projected to increase to 135 to 190 spaces. A 33% reduction in parking supply, or
 3 removing 117 spaces, would leave 265 spaces; this would be more than adequate to meet
 4 parking demand during those times when the shuttle would not be operating (weekdays
 5 during the shoulder and non-peak months). This assumes that the current supply
 6 includes 179 spaces in the lots, and an estimated 175 spaces on the shoulders of the road,
 7 totaling 354 spaces.

8 The following tables show estimated parking demand for 2002 and 2023 using data from
 9 the CTMP.

10

11 **Table 23: Parking Capacity at Muir Woods, 2002 & 2023**

12 Existing Parking Demand (2002)

Peak Season		Shoulder Season		Off Peak Season	
Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
380	450	155*	300	115*	250

13 Projected Parking Demand (2023)

Peak Season		Shoulder Season		Off Peak Season	
Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
485	575	190*	360	135*	285

14 * Periods when shuttle would not run

15

16

1 With removal of some parking and an increase in shuttle service, parking demand would
 2 be shifted to off-site lots in the vicinity of Highway 1 and US 101. The Welcome Center,
 3 in all alternatives, would provide parking for shuttle riders. In addition, the Manzanita
 4 and Pohono Street Park-and-Ride lots, currently used as shuttle parking, might also
 5 accommodate cars of shuttle riders. These lots, normally used by weekday commuters,
 6 would not be able to accommodate monument visitors during the work week without
 7 some reconfiguration. This detailed analysis would take place in future planning efforts.

8 Shuttle service would be increased from its current weekends-only schedule to 7 days a
 9 week during the peak period, and on weekends and holidays during the rest of the year.
 10 Service could run on 15-minute headways during the peak and shoulder seasons and on
 11 holidays, with 30-minute headways during other times (off-peak weekends). This is in
 12 addition to the downtown San Francisco Express Service present in all alternatives.

13 Operating costs for the increase in shuttle service required to carry a greater number of
 14 visitors to the monument are difficult to predict because of the unpredictable effect on
 15 visitation, the variable costs of administration and marketing, and also the effect the
 16 reduction of parking would have on the demand for transit. An analysis of the cost of
 17 shuttles was performed in the *Muir Woods Shuttle Alternatives* memo of August 2008
 18 (Nelson\Nygaard). In that analysis, based on the hourly cost of shuttle service,
 19 requirements for layovers and other factors, two cost estimates were developed for a 75%
 20 parking scenario (a 25% reduction), and are presented below. (A 66% (33% reduction)
 21 scenario analysis was not performed).

22 Scenarios involving a 25% removal of parking result in substantial shuttle operational
 23 costs. Note that these estimates do not include the cost of the vehicles or bus stop
 24 amenities necessary to support increased service, which would also be substantial.

25

26 **Table 24: Estimated Annual Cost of Shuttle, 75% Parking at Muir Woods**

27

	Peak off-site parking demand	Peak buses per hour	Fleet requirement	Annual Cost	
				\$75/hr.	\$180/hr.
Scenario 1-3-A: 75% on-site parking	170	9	9	\$500,000	\$1,200,000
Scenario 1-3-B: 75% on-site parking, S.F. shuttles	130	8	10	\$600,000	\$1,400,000

28

29 **Conclusion**

30 The transportation measures included in this alternative are likely to have a long-term,
 31 major, beneficial impact on connections between both ferry and regional bus transit and
 32 Muir Woods National Monument and the Muir Woods Shuttle. The shuttle would

1 become the primary mode of access to the monument. A much larger proportion of
2 visitors could be expected to park remotely and take the shuttle or express service from
3 San Francisco.

4 The reduction in the number of cars on the roads approaching Muir Woods National
5 Monument would have a long-term, moderate, beneficial impact on the functionality of
6 the transportation system. The reduction in congestion would allow the shuttles to stay on
7 schedule, and would allow emergency vehicles improved access to the area. This
8 alternative could have a long-term, minor to moderate, beneficial effect on pedestrian and
9 bicycle access by making the access roads safer for these visitors, and by re-designing the
10 walkways from the entry area to the woods so they are separated from auto traffic. The
11 25% reduction in parking could have a long-term, minor, adverse impact on parking
12 availability on those days when the shuttle is not running.

13

14 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

15 **Analysis**

16 In alternative 2, the majority of the built environment—buildings, parking lots, and paved
17 trails—would be removed, and all visitors would arrive by shuttle, bicycle, or on foot.
18 Only a small parking area would be available for **special needs**. The monument entrance
19 as well as all visitor services would be relocated to the current lower parking lot and
20 designed to accommodate a modest transit stop for the shuttle. This may have a long-
21 term, minor, adverse impact on visitors by distancing them from the entry to the mature
22 Redwood forest. *Note, if all visitors are arriving by bus, not sure how a “modest” transit*
23 *stop would accommodate this activity. – VT/NN I totally agree! Plus, what IS a modest*
24 *transit stop for a system of this size? BN/NN*

25 In addition to changes in modes of access to the monument, the trail system would be
26 redesigned to accommodate fewer visitors. The existing main trail would be relocated out
27 of the flood plain, paved surfaces would be removed, and other trails and bridges could
28 be removed or relocated to promote natural processes. These measures could have a long-
29 term, moderate, adverse impact on visitor’s ability to access areas of the mature Redwood
30 forest now available to them.

31 Trails in the monument would be designed to connect to other regional trails; the Dipsea
32 Trail would be realigned where it crosses Redwood Creek. This is likely to have a long-
33 term, minor, beneficial impact for those visitors connecting to the monument by trail.

34 Auto access would be eliminated, with all parking, both in-park lots as well as roadside
35 parking, removed. The upper lot and most of the lower lot in the monument would be
36 restored to their natural condition. To the degree that parking is considered part of the
37 transportation system, this action would have a long-term, major, adverse impact on
38 parking availability. However, the lack of parking would be offset by greatly increased
39 transit service, described below.

40 As discussed above, a Welcome Center would be created in the vicinity of U.S. 101 and
41 Highway 1, which would include parking for visitors and connections to transit, including
42 the Muir Woods Shuttle. Some additional parking may also be provided in other lots in

1 the area, currently used for weekend shuttle service. Park-and-Ride lots normally used by
2 commuters might not be able to accommodate monument visitors during the work week
3 without some reconfiguration. Turnover in these lots would be slower than those
4 currently in the monument, since the parking duration would include both the time
5 visiting the monument and the travel time to and from the monument. Detailed analysis
6 of lot configuration would take place in future planning efforts.

7 There remain the potential for a large number of visitors who would not make the trip to
8 Muir Woods National Monument if they could not drive their cars. This group includes
9 people who are continuing on to other destinations after their visit at the monument—for
10 example, Stinson Beach or Mount Tamalpais State Park. Another segment of visitors are
11 travelling in large groups, have small children, or have members in their party with
12 “special needs” requiring them to use a car. Thus it could be assumed that elimination of
13 all parking at the monument (except for special needs) might depress visitation, although
14 an exact percentage cannot be modeled.

15 In addition, there will inevitably be those who drive to Muir Woods National Monument
16 regardless of whether there is any official parking provided. Muir Woods Road is public
17 and connects small coastal communities, so access to the monument by road cannot be
18 prohibited or even limited. Some visitors will arrive from points west and north, and will
19 not have an opportunity to board transit to get to the monument. It can be reasonably
20 assumed that these cars will end up parked somewhere in the vicinity. With all roadside
21 parking prohibited, motorists are likely to park there anyway, relying on lax enforcement
22 or accepting the cost of a parking ticket as the price for driving to the monument.
23 Enforcement of parking regulations at the monument would have to increase significantly
24 for the elimination of roadside parking to be effective. This cost would likely be borne by
25 the NPS rather than Marin County, since County law enforcement staff is extremely
26 limited in West Marin.

27 Transit service to the monument would be dramatically increased. The Muir Woods
28 Shuttle would run every day of the year, and would include express service from/to
29 downtown San Francisco. Shuttle service originating in Marin County could run every 10
30 minutes during the peak and shoulder seasons and on holidays; on other days, it would
31 run every 30 minutes. Providing increased service from Sausalito and express service
32 from San Francisco could be expected to reduce parking demand by 25% or more. This is
33 based on surveys of monument visitors; nearly half of all monument visitors begin their
34 trip in San Francisco, and in a 2007 survey, one out of six drivers said they would
35 consider taking a shuttle from San Francisco. Ridership on the Sausalito-based Muir
36 Woods Shuttle has increased steadily since its inception as riders discovered they could
37 make the whole trip on transit. A significant increase in transit service, including San
38 Francisco Express and Muir Woods Shuttle service to the Sausalito Ferry, would have a
39 long-term, major, beneficial impact on the functionality of the transportation system to
40 Muir Woods National Monument by increasing the number and capacity of connections,
41 and increasing the availability and choices of modes of travel.

42 Operating costs for the increase in shuttle service required to carry all visitors to the
43 monument are difficult to predict because of the unpredictable effect on visitation, and
44 also the variable costs of administration and marketing. An analysis of the cost of shuttles
45 was performed in the *Muir Woods Shuttle Alternatives* memo of August 2008

1 (Nelson\Nygaard). In that analysis, based on the hourly cost of shuttle service,
 2 requirements for layovers and other factors, three cost estimates were developed for the
 3 zero-parking scenario, and are presented below. Scenarios involving complete removal of
 4 parking appear to be prohibitively expensive – as much as \$9.5 million per year for a
 5 package including San Francisco service. If tour bus access were removed, costs would
 6 increase further, to as much as \$11.5 million per year. Note that these estimates do not
 7 include the cost of the vehicles or bus stop amenities.

8

9 **Table 25: Estimated Annual Cost of Shuttle Operations, No Parking at Muir Woods**

	Peak off-site parking demand	Peak buses per hour	Fleet Requirement	Annual Cost	
				\$75/hr.	\$180/hr.
Scenario 2-A: 0% on-site parking	690	23	23	\$3,000,000	\$7,300,000
Scenario 2-B: 0% on-site parking, S.F. shuttles	520	22	28	\$4,000,000	\$9,500,000
Scenario 2-C: 0% on-site parking, no tour buses, S.F. shuttles	550	25	34	\$4,800,000	\$11,500,000

10

11 Managers at the monument estimates that 20% of visitors arrive by tour bus. In this
 12 alternative, private tour buses would not be allowed in the monument. The elimination of
 13 tour bus service would significantly reduce access to this site for certain populations.
 14 People who use this mode are generally from out of the area, are travelling in groups, and
 15 want to visit multiple destinations on one trip – a significant factor for those choosing not
 16 to take the shuttle, according to surveys of monument visitors. Tour buses address the
 17 needs of this group and also allow them to visit the monument without an auto. Without
 18 tour bus service, this group is likely to not visit the monument at all. This measure could
 19 have a long-term, moderate, adverse impact on access to the monument.

20 **Conclusion**

21 Alternative 2 proposes actions which would significantly alter the transportation system
 22 serving Muir Woods National Monument. Redesign of pedestrian walkways and access is
 23 likely to have a long-term, moderate, beneficial impact on visitor access and safety. The
 24 elimination of all parking at Muir Woods National Monument would have multiple
 25 impacts.

26 In conjunction with the parking provided at the offsite Welcome Center as well as other
 27 remote parking lots, and greatly increased transit service to the monument, it can be seen
 28 as having a long-term major, beneficial, impact on availability of transit, improved traffic
 29 flow, and number and capacity of transit connections.

30 Removing parking from Muir Woods is likely to result in a reduction in the number of
 31 cars from the roads in southwest Marin, such that transit can run on schedule, emergency

1 vehicles can have access, and residents are not negatively impacted by auto congestion.
2 However, while expanded transportation options may increase visitation, from the point
3 of view of the visitor who arrives at the monument by car and is unable to park, the
4 impact might be seen as long-term, moderate, and adverse, limiting the ability or desire
5 of some number of visitors to visit the monument.

6 The increase in transit services from San Francisco and the Sausalito Ferry, through
7 points in south Marin, is likely to have long-term, major, beneficial effects on the
8 transportation system to the monument as well as throughout the southwest Marin County
9 area by increasing multi-modal opportunities to get to the monument and increasing
10 connectivity to regional transportation.

11 Auto access may experience a long-term, minor to moderate, beneficial impact since
12 there may be much less auto traffic on Muir Woods Road, while bus traffic on Highway 1
13 would increase significantly.

14

15 **Alternative 3: Focusing on National Treasures**

16 Transportation impacts for alternative 3 for Muir Woods National Monument are
17 identical to those in alternative 1.

18

19 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

20 **No action Alternative**

21 ***Analysis***

22 Under the no-action alternative, there would be the continuation of current management,
23 programs, and operations; funded construction projects; and the annual operating funding
24 needed to continue current operations.

25 Muir Woods maintains high standards of visitor service thanks to a committed team of
26 NPS staff, partnerships with the Golden Gate National Parks Conservancy and
27 concessions, and a team approach that also includes close working relationships with the
28 state parks and neighboring communities. However, there is much operationally that is
29 marginal due to the small staff size; this results in little time for long-term planning,
30 major project implementation, and training.

31 Staffing levels would continue at current levels, which are inadequate to meet the
32 responsibilities of the monument. With only 3.5 interpreters and no seasonal interpreters,
33 there are often periods of time when no ranger is on site, and the NPS presence is loosely
34 covered by interns or volunteers. The interpreters handle educational programs and
35 volunteer management, but there is no one to handle media, training, or partner
36 programming. The law enforcement division operates with one staff member assigned to
37 the area; which includes the monument as well as Muir Beach, Stinson Beach, Olema
38 Valley, Slide Ranch, and Tennessee Valley. One seasonal law enforcement officer is
39 assigned to the monument in the summer as well. This level of staffing is not enough to
40 provide adequate coverage, and results in delays in response time—often interpreters on

1 site end up spending time responding to emergency incidents. Traffic congestion and
2 conflict is one area of needed additional law enforcement staff. A ranger is needed to
3 provide visitor use assistance for the shuttle and parking. The maintenance division is
4 also understaffed to adequately maintain the monument in good condition. As a result,
5 deferred maintenance has accrued at park facilities. Low staffing levels contribute to
6 continued moderate, long-term, adverse impacts to park operations.

7 Primary monument partners are the Golden Gate National Parks Conservancy (GGNPC)
8 and the Muir Woods Trading Company (MWTC), the concessions operation. These
9 partners provide a host of valuable services and products to the monument, such as
10 contact with the visitors, research, restoration, and messaging. They also provide needed
11 funding from fee collection and concession sales. Other partners offer educational
12 programs. The Save-the-Redwoods League is a major funder to enable young people to
13 visit the park and support research. Marin County is a partner in providing shuttle service
14 to the monument. The partners offer something invaluable that would not otherwise be
15 provided and their continued involvement and support is a moderate, long-term,
16 beneficial impact to park operations.

17 Volunteers are indispensable to the monument. They provide personal interpretive
18 services, conduct special tours, support educational programs, complete much of the
19 restoration work, and offer a special approach that the public responds to very favorably.
20 Thousands of hours per year are logged by volunteers. Volunteer efforts are a continued
21 long-term, moderate, beneficial impact to park operations.

22 Currently, the condition of many of the buildings is good, but not accessible for persons
23 with disabilities. However, the monument has significant amounts of deferred
24 maintenance. Even given the direction of the park asset management plan for prioritizing
25 funds, a continued gap in maintenance funding (and staff) would result in an increasing
26 deferred maintenance backlog. Some facilities are better maintained than others are; the
27 Administration and Concessions building is in good condition. Maintenance facilities,
28 such as the Old Inn, are generally in much poorer condition. Facilities in the Camino del
29 Canon and Conlon Avenue areas are also in poor condition. Infrastructure such as power,
30 water, and phones need to be upgraded and frequently have lapses in service. Inadequate
31 project funds and operational funds would result in moderate, long-term, adverse impacts
32 to mission critical facilities at the monument.

33 Monument buildings are inadequate for their current uses due to small size and their lack
34 of modern functionality. For example, in the office areas, all desks are shared, and half
35 the computers are not hooked up to the internet. There are no break rooms or meeting
36 rooms. The maintenance division does not have adequate storage space for equipment, or
37 appropriate work space. Inadequate operational facilities would have a continued long-
38 term, minor to moderate, adverse impact on park operations.

39 **Conclusion**

40 The continuation of current management would have both beneficial and adverse impacts
41 on park operations. Continued long-term, moderate, beneficial impacts to operations
42 would result from partner and volunteer efforts.

1 The continued impact of low staffing levels on park operations is moderate, long-term,
2 and adverse. Inadequate project and operational funding would result in major, long-term,
3 adverse impacts to park facilities. Inappropriate space for staff would also result in
4 continued long-term, minor to moderate, adverse impacts to monument operations.

5

6 **Alternative 1: Connecting People with the Parks**

7 ***Analysis***

8 There are several proposed changes indentified in alternative 1 that would influence park
9 management, operations, and facilities. While designed to contribute to the protection of
10 resources and the enhancement of visitor opportunities, the proposed changes will
11 achieve these ends only if staffing, capital funds, and operating funds are increased in
12 accordance with the cost estimates identified. If funding and needed staffing levels are
13 not made available when these actions are implemented, the proposed actions would have
14 long-term, moderate, adverse effects on park operations.

15 Additional law enforcement officers are proposed to cover increased picnicking,
16 expanded visitor activities, and the potential for a greater number of lost or injured
17 people. Additional rangers would also assist in parking management at the shuttle station.
18 New maintenance staff would support trail maintenance, upkeep of interpretive signs,
19 increased picnicking, and relocated and new visitor facilities. Increased staff would result
20 in long-term, moderate, beneficial impacts to operations if appropriate funding is
21 available, otherwise the actions of this alternative would result in adverse impacts such as
22 an inability to maintain facilities and an inability to ensure public safety and protection of
23 resources.

24 The proposed new or reconstructed facilities, such as the Highway 1/101 welcome center
25 and parking area, would require additional capital investments. Unless the cyclic
26 maintenance budget is collaborated to maintain the park's facilities as identified in this
27 alternative, the deferred maintenance will increase, even with an initial investment in that
28 asset. Adjusting the operations and maintenance budget to realistically reflect the true
29 costs of a facility will have a long-term, moderate, beneficial impact on park operations;
30 otherwise, the impact would be adverse and result in an increase of deferred maintenance.

31 Removal of nonessential buildings and parking would reduce associated maintenance and
32 utility costs. Construction, rehabilitation, restoration, and demolition projects proposed in
33 the alternative would result in moderate, long-term, beneficial impacts to park operations.
34 These activities would also have short-term, minor, adverse impacts on operations due to
35 the closure of buildings and lands during construction or restoration.

36 ***Conclusion***

37 Increased staff would result in moderate, long-term, beneficial impacts, if funded. If
38 funding is available for construction, rehabilitation, restoration, and demolition projects,
39 these projects would result in moderate, long-term, beneficial impacts to park operations.
40 Construction and landscape restoration activities would also result in short-term, minor,
41 adverse impacts while they are underway. However, if funding and needed staffing levels

1 are not made available when these actions are implemented, the proposed actions would
2 have long-term, moderate adverse effects on park operations.

3

4 **Alternative 2: Preserving and Enjoying Coastal Ecosystems**

5 **Analysis**

6 If adequate funding is available for additional staff for the public safety division at Muir
7 Woods National Monument, such increases would result in moderate, long-term,
8 beneficial impacts to operations. Increased law enforcement staff is recommended to
9 manage the controlled visitor areas and to protect sensitive resources. Additional rangers
10 would also assist in parking management at the shuttle station. Maintenance staff would
11 decrease under this alternative because of the reduced number of facilities.

12 The effort to remove most facilities from the monument would have both positive and
13 negative impacts to the operations. While demolition and natural resource restoration
14 would require additional project funding and require staff effort in the short-term, over
15 the long-term, staff efforts in maintenance of facilities would be reduced, and deferred
16 maintenance would be reduced. However, new proposed facilities, such as the Highway
17 1/101 welcome center and the Muir Woods welcome center would require adjustment of
18 the operations and maintenance budget to realistically reflect the true costs of the
19 facilities in order to have beneficial impacts on park operations; otherwise, the impact
20 would be adverse and result in an increase of deferred maintenance. Construction,
21 rehabilitation, restoration, and demolition projects proposed in the alternative would
22 result in major, long-term, beneficial impacts to park operations if funded. Construction
23 and landscape restoration activities would result in short-term, minor, adverse impacts
24 while they are underway due to area and facility closures.

25 **Conclusion**

26 Increased staff would result in moderate, long-term, beneficial impacts. If fully funded,
27 construction, rehabilitation, restoration, and demolition projects proposed in the
28 alternative would result in major, long-term, beneficial impacts to park operations.
29 Construction and landscape restoration activities also would result in short-term, minor,
30 adverse impacts to park operations. Removal of much of the development from inside the
31 monument could make public safety responses more difficult, and would result in a minor
32 to moderate, long-term, adverse impact to park operations. However, if funding and
33 needed staffing levels are not made available when these actions are implemented, the
34 proposed actions would have long-term, moderate, adverse effects on park operations.

35

36 **Alternative 3: Focusing on National Treasures**

37 **Analysis**

38 If adequate funding is available for additional public safety and maintenance staff at Muir
39 Woods National Monument, such increases would result in moderate, long-term,
40 beneficial impacts to operations. Additional law enforcement officers are proposed to

1 cover increased picnicking, expanded visitor activities, and the potential for a greater
2 number of lost and injured people. Additional rangers would also assist in parking
3 management at the shuttle station. Additional maintenance staff would support trail
4 maintenance, upkeep of interpretive signs, increased picnicking, and relocated welcome
5 centers.

6 The proposed new or reconstructed facilities, such as the Highway 1/101 welcome center
7 and interpretive trail improvements, would require additional capital investment. Unless
8 the cyclic maintenance budget is collaborated to maintain the park's facilities as
9 identified in this alternative, the deferred maintenance will increase, even with an initial
10 investment in that asset. Adjusting the operations and maintenance budget to realistically
11 reflect the true costs of facilities would have a long-term, moderate, beneficial impact on
12 park operations; otherwise, the impact would be adverse and would result in an increase
13 in deferred maintenance.

14 Removal of nonessential buildings and parking would reduce associated maintenance and
15 utility costs. If fully funded, construction, rehabilitation, restoration, and demolition
16 projects proposed in the alternative would result in moderate, long-term, beneficial
17 impacts to park operations. Construction and landscape restoration activities would result
18 in short-term, minor, and adverse impacts park operations while the activities are
19 underway.

20 **Conclusion**

21 Increased staff would result in moderate, long-term, beneficial impact if adequate funding
22 is available. If funding is available, construction, rehabilitation, restoration, and
23 demolition projects proposed in the alternative would result in moderate, long-term,
24 beneficial impacts to park operations. Construction and landscape restoration activities
25 also would result in short-term, minor, adverse impacts to park operations while the
26 activities are underway. However, if funding and needed staffing levels are not made
27 available when these actions are implemented, the proposed actions would have long-
28 term, moderate, adverse effects on park operations.

29

30

PART 10: OTHER ANALYSES AND STATUTORY CONSIDERATIONS

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INTRODUCTION AND METHODOLOGY

2

3 This part of the document discusses other impact analyses required by NEPA and the
4 Council on Environmental Quality (CEQ). It includes discussions regarding the potential
5 for cumulative impacts, natural or depletable resource requirements and conservation
6 potential, effects on energy requirements and conservation potential, irretrievable or
7 irreversible commitments of resources, unavoidable adverse impacts, and the relationship
8 between short-term uses and long-term productivity of the environment.

9

10

11

CUMULATIVE IMPACT ANALYSIS AT GOLDEN GATE NATIONAL RECREATION AREA (INCLUDING ALCATRAZ ISLAND)

4

5 **METHODOLOGY**

6 The National Environmental Policy Act (NEPA) requires an EIS to identify and analyze
7 cumulative impacts. A cumulative impact is described in the CEQ regulation 1508.7 as
8 follows:

9 *Cumulative impacts* are the impacts that result from incremental impacts of the action
10 when added to other past, present, and reasonably foreseeable actions, regardless of
11 what agency (federal or nonfederal) or person undertakes such other action.

12 Cumulative impacts can result from individually minor, but collectively significant,
13 actions taking place over time.

14 The analysis of cumulative impacts must also evaluate the proposed project's potential to
15 contribute to the significant cumulative impacts identified and it must discuss feasible
16 options for mitigating or avoiding any contributions assessed as cumulatively
17 considerable. The discussion of cumulative impacts is not required to provide as much
18 detail as the discussion of the project's *individual impacts*, or the effects attributable to
19 the project alone. Rather, the level of detail should be guided by what is practical and
20 reasonable. The analysis of cumulative impacts uses the same concepts of type, duration,
21 timing, and intensity as described for individual impacts.

22 The action area for assessing cumulative impacts on the resources retained for detailed
23 analysis is the three-county area (Marin, San Francisco, and San Mateo) where the park
24 lands are located.

25 To determine the potential cumulative impacts on the resources, other projects and
26 actions within the three-county area were identified (see "Appendix B: Related
27 Management Plans" for a detailed listing of plans with actions that could have cumulative
28 impacts). Projects were identified by discussions with NPS staff, other public land
29 managers, and representatives of city and county governments. Potential projects
30 identified as possible contributors to cumulative impacts included any planning or
31 development activity that was currently being implemented, or is expected to be
32 implemented in the future. Impacts of past actions were also considered in the analysis. A
33 summary of the selected plans and projects that were determined to be relevant to each of
34 the impact topics is included at the beginning of each cumulative impacts section.

35 These projects and actions were evaluated in conjunction with the impacts of each alter-
36 native to determine if they would result in any cumulative impacts on a particular natural
37 or cultural resource, visitor use and experience, the social and economic environment,
38 transportation, or NPS operations and management. The evaluation of cumulative
39 impacts is qualitative and based on a general description of the project. Cumulative

1 impacts at Golden Gate National Recreation Area and Muir Woods National Monument
2 are discussed independently.

3

4 **NATURAL RESOURCES**

5 A number of plans and projects, if implemented, could contribute to cumulative impacts
6 on natural resources. Plans and projects that have a relationship to this general
7 management plan are identified and described in appendix B. Those plans and projects
8 that are most relevant to natural resources and could contribute to cumulative impacts on
9 this topic include the Redwood Creek Watershed Vision and various restoration projects
10 in the watershed; county transportation plans; management plans for various California
11 state parks; the Point Reyes National Seashore draft general management plan and fire
12 management plan; other plans and projects at Golden Gate National Recreation Area,
13 such as the fire management plan, dog management plan, and the redevelopment of Fort
14 Baker; the Gulf of the Farallones National Marine Sanctuary plan; beach nourishment
15 activities; regional land protection plans and activities such as Golden Lands, Golden
16 Opportunities; the management of lands adjacent to the park; and past land use practices
17 in the region.

18

19 **Carbon Footprint and Air Quality**

20 Implementation of the plans and projects mentioned in the opening paragraph of this
21 section would contribute to cumulative impacts on carbon footprint and air quality.
22 County transportation plans and projects aimed at reducing personal automobile use and
23 improving alternative transportation would have beneficial cumulative impacts by
24 reducing transportation-related emissions. Projects aimed at improving ecosystems and
25 enhancing natural resources would result in adverse cumulative impacts in the short-term,
26 but these would be outweighed by long-term reductions in emissions and the resultant
27 improvement in air quality. The same would be true for the actions related to the
28 management of adjacent public lands, where near-term projects would have short-term
29 adverse impacts on carbon footprint and air quality, but the actions associated with long-
30 term objectives to reduce energy use and emissions and improve the condition of natural
31 systems would have long-term beneficial cumulative impacts. Regional land protection
32 efforts would continue to preserve open space. This would reduce the amount of land
33 available for development and would provide air quality benefits. The actions associated
34 with the management of private lands in the region would likely continue to result in
35 adverse impacts to carbon footprint and air quality, as these actions would likely continue
36 to be sources of energy use and air quality emissions that could increase over time as
37 densities increase.

38 While the GMP no-action alternative and action alternative 1 would have adverse impact
39 to the park's carbon footprint, alternatives 2 and 3 would have beneficial effects on the
40 carbon footprint. All action alternatives would have a negligible effect on air quality.
41 When the likely effects of implementing the actions contained in the GMP alternatives
42 are added to the effects of other past, present, and reasonably foreseeable actions
43 described above, there would be a minor, adverse cumulative impact on carbon footprint

1 and air quality in the short-term, and a minor, beneficial, cumulative impact on carbon
2 footprint and air quality over the long-term. The actions contained in the GMP
3 alternatives would contribute a very small increment to this cumulative impact.

4 **Alcatraz?**

5

6 **Soils and Geologic Resources and Processes**

7 Implementation of the plans and projects mentioned in the opening paragraph of this
8 section would have cumulative impacts on soils and geologic resources and processes.
9 Implementation of county transportation plans and projects that would modify roadways
10 would likely result in adverse impacts to roadside soils and geologic resources and would
11 contribute to changes in the functionality of geologic processes in the area. Beach
12 nourishment activities would continue to provide essential sources of sand to off-shore
13 and shoreline environments, resulting in a beneficial impact; however, the continuation of
14 dredging and alteration of off-shore sand deposits would continue to cause adverse
15 impacts to natural sand transport processes. Projects aimed at improving ecosystems and
16 enhancing natural resources could result in adverse cumulative impacts in the short-term,
17 but these would be outweighed by long-term improvements to function and integrity of
18 soils and natural geologic processes. The same would be true for actions associated with
19 the management of adjacent public lands, where near-term projects could have short-term
20 adverse impacts on soils and geologic resources, but actions to achieve long-term
21 objectives to improve natural systems would have long-term beneficial cumulative
22 impacts on soils and geologic processes. Regional land protection efforts would continue
23 to preserve open space and protect soils and geologic resources. The actions associated
24 with the management of private lands in the region would continue to have both adverse
25 and beneficial impacts on soils and geologic processes, depending on the nature of land
26 use and stewardship practices.

27 The existing recreation facilities and new recreation development actions in all GMP
28 alternatives would have localized adverse effects on soils and geological resources.
29 However, action alternatives 1, 2, and 3 would also have beneficial effects on soil
30 conditions in other areas, by eliminating unsustainable roads and trails, removing
31 facilities and structures, and restoring the respective sites. Alternative 2 would have the
32 least amount of adverse effect from new recreation and the most beneficial effect from
33 natural restoration. When the likely effects of implementing the actions contained in the
34 GMP alternatives are added to the effects of other past, present, and reasonably
35 foreseeable actions described above, there would be a long-term, minor, beneficial
36 cumulative impact on soils and geologic resources and processes.

37 **Alcatraz?**

38

39 **Water Resources and Hydrologic Processes**

40 Implementation of the plans and projects mentioned in the introduction to this section
41 would have cumulative impacts on water resources and hydrologic processes. County
42 transportation plans and projects would modify roadways that could modify surface water
43 flow and drainage. Roadway projects would also likely result in soil erosion and generate

1 urban pollutants that would adversely impact water quality. Conversely, certain projects
2 would reduce sedimentation and improve the conveyance of water—beneficial impacts.
3 Projects aimed at improving ecosystems and enhancing natural resources (i.e., Big
4 Lagoon restoration, Lower Redwood Creek floodplain restoration, Fern Creek riparian
5 fencing, Coast Trail habitat enhancement projects, sediment reduction projects) could
6 result in adverse cumulative impacts to water resources and water quality in the short-
7 term, but these impacts would be outweighed by long-term improvements to the integrity
8 and function of water resources, especially for wetlands, floodplains, and natural creek
9 processes. The same would be true for actions associated with the management of
10 adjacent public lands, where near-term projects could have short-term adverse impacts on
11 water resources (including water quality and quantity), but actions to achieve long-term
12 objectives of improved natural systems would have long-term beneficial cumulative
13 impacts on water resources and hydrologic processes. Regional land protection efforts
14 would continue to preserve open space and protect water resources. Actions associated
15 with the management of private lands in the region would continue to have both adverse
16 and beneficial impacts on water resources and hydrologic processes, depending on the
17 nature of land use and stewardship practices.

18 All GMP alternatives include actions that provide for the restoration of natural areas and
19 ecological processes, which directly and indirectly help restore the natural hydrologic
20 regime. When the likely effects of implementing the actions contained in the GMP
21 alternatives are added to the effects of other past, present, and reasonably foreseeable
22 actions described above, there would be a long-term, minor to moderate, beneficial
23 cumulative impact on water resources and hydrologic processes.

24 **Alcatraz?**

25

26 **Habitat (Vegetation and Wildlife) and Special Status Species** 27 **(Federal and State Threatened and Endangered Species)**

28 All of the plans and projects mentioned in the introduction to this section would have
29 cumulative impacts on vegetation and wildlife habitat, if implemented. County
30 transportation plans and projects would modify roadways that could alter the integrity of
31 native habitat, increase habitat fragmentation, and introduce exotic plants and animals
32 that could displace and adversely affect native species, including special status species.
33 Roadway projects would also likely result in soil erosion and generate urban pollutants
34 that would adversely impact aquatic habitats. Conversely, certain projects would reduce
35 impacts from roadways and improve migration corridors. Restoration projects aimed at
36 improving ecosystems and enhancing natural resources could result in adverse
37 cumulative impacts to native habitat in the short-term, but these impacts would be
38 outweighed by long-term improvements to the integrity and function of habitat. The same
39 would be true for actions associated with the management of adjacent public lands, where
40 near-term projects could have short-term adverse impacts on habitat, but actions
41 implemented to achieve long-term objectives to improve natural systems would have
42 long-term beneficial cumulative impacts on habitat integrity and function. Regional land
43 protection efforts would continue to preserve open space and protect a variety of habitat
44 types. Actions associated with the management of private lands in the region would

1 continue to have both adverse and beneficial impacts on vegetation and wildlife habitat,
2 depending on the nature of land use and stewardship practices.

3 All of the GMP alternatives include actions that provide for natural restoration,
4 education, and stewardship that would have beneficial effects on wildlife habitat. Action
5 alternatives 1, 2, and 3 include actions that would provide additional habitat benefits by
6 eliminating unsustainable or unneeded roads, trails, or facilities, and restoring the
7 respective sites. However, action alternatives 1, 2, and 3 would also yield some adverse
8 effects by expanding visitor access and recreation development in some areas. As for the
9 waterbird habitat at Alcatraz Island, the no-action alternative and action alternatives 1
10 and 3 would have adverse effects, while alternative 2 would have beneficial effects.

11 When the likely effects of implementing the actions contained in the GMP alternatives
12 are added to the effects of other past, present, and reasonably foreseeable actions
13 described above, there would be a long-term, minor to moderate, beneficial cumulative
14 impact on vegetation and wildlife habitat. Although impacts on local special status
15 species and their habitat in the project area would be mitigated to minimize potential
16 impacts, and impacts of other projects in the area would generally be beneficial, the
17 adverse impacts from urbanization of the region would continue to result in habitat loss;
18 the cumulative impact to most special status species and their habitat would be adverse.

19

20 **CULTURAL RESOURCES**

21 A number of past, present, and ongoing plans, programs, and projects, if implemented,
22 could contribute to cumulative impacts on cultural resources. Plans, programs, and
23 projects that have a relationship to this general management plan are described in the
24 section “Relationship of This Plan to Other Plans” in Part 1 and in “Appendix B:
25 Description of Management Plans.” Those plans and projects that are most relevant to
26 and could contribute to cumulative impacts on cultural resources include the following:

- 27 • NPS plans currently being prepared such as the [Draft] Extension of San
28 Francisco Municipal Railway’s Historic Streetcar Environmental Impact
29 Statement
- 30 • NPS trails and transportation plans and programs such as the *Marin Headlands*
31 *and Fort Baker Transportation Infrastructure and Management Plan Final*
32 *Environmental Impact Statement* [2009]
- 33 • NPS restoration plans such as the *Alcatraz Island Historic Preservation and*
34 *Safety Construction Program Environmental Impact Statement* [2001], and
35 restoration plans for Redwood Creek and Big Lagoon
- 36 • NPS program implementation plans such as the *Alcatraz Development Concept*
37 *Plan and Environmental Assessment* [1993], and the redevelopment plan for Fort
38 Baker

- 1 • State and regional plans such as the *California Department of Parks and*
2 *Recreation – Angel Island State Park Resource Management Plan/General*
3 *Development Plan/Environmental Impact Report* [1979]
- 4 • County and local plans such as the *Marin Countywide Plan* [2007] and amended
5 [2009], *PG & E Jefferson-Martin 230KV Transmission Line Proposed Settlement*
6 *and Environmental Assessment* [2004], *San Francisco Public Utilities*
7 *Commission Peninsula Watershed Management Plan* [2002], and the *San*
8 *Francisco General Plan* [2004]

9
10 Past human use and practices and management of lands in and around Golden Gate
11 National Recreation Area, such as agricultural operations and construction associated
12 with urban, suburban, military, and recreational development, have also contributed to
13 cumulative impacts on cultural resources.

14

15 **Archeological Resources**

16 The actions in the plans, programs, and projects that are listed above, as well as past
17 human use and management of lands in and near the park would have cumulative impacts
18 on archeological resources. Development projects, NPS trails and transportation
19 programs, NPS restoration and redevelopment projects, and county and local plans could
20 result in adverse cumulative impacts to archeological resources as a result of ground
21 disturbance operations; however, NPS projects and plans implemented on park lands
22 would include every effort to preserve archeological resources or mitigate sites that could
23 not be avoided. NPS restoration and redevelopment plans would have beneficial
24 cumulative impacts on archeological resources because they would emphasize cultural
25 resource protection and preservation as well as mitigation if sites could not be avoided.
26 Similarly, state and regional plans would have beneficial cumulative impacts on
27 archeological resources because they would emphasize cultural resource protection and
28 preservation.

29 Past human use and management of lands in and around the park, such as agricultural
30 operations, ranching, and construction associated with urban, suburban, military, and
31 recreational development, may have already resulted in adverse cumulative impacts to
32 archeological resources because these resources could have been lost or degraded as a
33 result of ground disturbing operations and the lack of understanding and appreciation of
34 these resources.

35 When the likely impacts of implementing the actions contained in the GMP alternatives
36 are added to the impacts of other past, present, and reasonably foreseeable actions
37 described above, there would be cumulative, long-term, minor to moderate, adverse
38 impacts on archeological resources on lands in and near the park. The actions contained
39 in the GMP alternatives would generally contribute a small beneficial increment to the
40 overall adverse cumulative impacts on archeological resources.

41

42

1 **Ethnographic Resources**

2 NPS restoration plans associated with Alcatraz Island would provide for repair,
3 stabilization, and rehabilitation of cultural resources on the island, resulting in long-term,
4 minor to moderate, beneficial cumulative impacts to the island's ethnographic resources
5 and contributing to the island's ethnographic significance for American Indian tribes and
6 organizations. Past human use and management of Alcatraz Island, such as agricultural
7 operations and construction associated with military, penitentiary and recreational
8 development, may have resulted in the lost or degradation of ethnographic resources,
9 adding to the adverse cumulative impacts .

10 When the likely effects of implementing the actions contained in the GMP alternatives
11 are added to the impacts of other past, present, and reasonably foreseeable actions
12 described above, there would be long-term, minor, adverse cumulative impacts to
13 ethnographic resources on Alcatraz Island. However, the actions contained in the GMP
14 alternatives would generally contribute a small beneficial increment to the overall
15 adverse cumulative impacts on ethnographic resources.

16

17 **Historic Buildings**

18 Past human use and management of lands that are in and near the park, such as
19 construction associated with urban, suburban, and recreational development and
20 activities, have resulted in the loss or deterioration of historic buildings in the San
21 Francisco Bay area. The park's seacoast fortifications today comprise what is widely
22 considered to be the most comprehensive collection of military architecture and coastal
23 defense systems and the finest surviving examples of military engineering for coastal
24 defense in the United States. NPS trails and transportation plans and programs, NPS
25 restoration and redevelopment plans, NPS program implementation plans, state and
26 regional plans; and county and local plans, all provide for the protection and preservation
27 of historic buildings and their architectural values and therefore the implementation of
28 these plans would contribute to beneficial cumulative impacts on historic buildings.

29 When the likely effects of implementing the actions contained in the GMP alternatives
30 are added to the impacts of other past, present, and reasonably foreseeable actions
31 described above, there would be a cumulative, long-term, moderate, beneficial impact to
32 historic buildings. The actions contained in the GMP alternatives would contribute a
33 relatively large beneficial increment to the overall cumulative impacts on historic
34 buildings.

35

36 **Cultural Landscape Resources**

37 Implementation of NPS trails and transportation plans and programs and county and local
38 plans, such as the Marin Countywide Plan and the San Francisco General Plan, would
39 have beneficial cumulative impacts on cultural landscape resources because of their
40 emphasis on preservation of cultural landscapes and minimization of adverse effects on
41 cultural landscapes. Implementation of NPS plans currently being prepared, such as the
42 Extension of San Francisco Municipal Railway's Historic Streetcar, and county and local
43 plans, such as the PG & E Jefferson-Martin 230KV Transmission Line Proposed

1 Settlement, would result in the introduction of new elements to the cultural landscapes of
2 the San Francisco Bay area and thus potentially compromise the integrity of those
3 cultural landscapes. Implementation of NPS restoration plans, such as those for Redwood
4 Creek and Big Lagoon, could result in the loss of some cultural landscape resources and
5 thus compromise their cultural landscape values.

6 Implementation of NPS restoration and program plans, state and regional plans, and
7 county and local plans would result in beneficial cumulative impacts on cultural
8 landscape resources because of their emphasis on protection, preservation, and
9 rehabilitation of cultural landscape resources and values. Past human use and
10 management of lands in and near the park, such as agricultural operations, ranching, and
11 construction associated with urban, suburban, military, and recreational development,
12 have compromised the integrity of cultural landscapes, and have resulted in the loss of
13 many of the region's cultural landscape resources and values.

14 When the likely impacts of implementing the actions contained in the GMP alternatives
15 are added to the effects of other past, present, and reasonably foreseeable actions
16 described above, there would be a long-term, minor to moderate, adverse cumulative
17 impact on cultural landscape resources. The actions contained in the GMP alternatives
18 would contribute to beneficial impacts on cultural landscape resources, but they would
19 contribute only a small increment to the overall cumulative impacts on cultural landscape
20 resources.

21

22 **Museum Collections**

23 None of the past, present, or ongoing plans, programs, and projects described in the
24 "Relationship of This Plan to Other Plans" section in Part 1 of this document or in
25 "Appendix B: Description of Management Plans" would have any appreciable
26 cumulative impacts on museum collections. The past and present actions that have
27 resulted in the storage of the museum collections in 15 different locations and under
28 conditions that do not meet NPS standards have contributed to their degradation and
29 potential loss, resulting in a significant adverse condition. The actions contained in the
30 GMP alternatives would contribute to cumulative, long-term, moderate, beneficial
31 impacts on the park's museum collection.

32

33 **VISITOR USE AND EXPERIENCE**

34 The cumulative impacts on visitor use and experience resulting from the actions
35 described in the GMP alternatives in combination with actions resulting from related
36 projects and policies of other entities within the Bay Area are identified in this section. In
37 preparing the cumulative impacts the actions of the past, present, and foreseeable future
38 were estimated at a qualitative level given the visionary type of plan that is the general
39 management plan. In estimate the impacts of others in combination with the GMP
40 alternatives the team relied on the actions or potential actions from various local, state,
41 and federal plans and projects as well as the knowledge of the park staff. A summary of

1 these other plans can be found in the sections titled *Relationship to Other Plans* and in
2 *Appendix B: Related Management Plans*.

3 The actions from plans and projects that are most relevant to visitor use and experience
4 and could contribute to cumulative impacts include: county comprehensive plans; local
5 open space and transportation plans and projects; area park plans such as those for Angel
6 Island State Park, Mt. Tamalpais State Park, and Point Reyes National Seashore; the
7 Redwood Creek Watershed Vision; plans and projects at Golden Gate National
8 Recreation Areas such as the Trails Forever Initiative, a dog management plan, equestrian
9 planning in Marin County, and the redevelopment of Fort Baker; as well as several other
10 educational, stewardship, and recreation plans and projects taking place in the Bay Area.
11 These various other actions would generally be beneficial impacts to visitor use and
12 experience in the area by providing an increased diversity of recreation opportunities,
13 additional educational and stewardship programs, and improved connectivity between
14 public lands and open space in the region.

15

16 **Diversity of Recreation Opportunities and Availability of Other** 17 **Visitor Support Services and Facilities**

18 The GMP alternatives provide for a wide variety of recreational opportunities for park
19 visitors, as well as a network of other visitor support services and facilities. The variety
20 of existing and new recreational opportunities provided by the no-action alternative and
21 action alternatives 1 and 3, respectively, would all have notable beneficial effects on
22 visitor use and experience. Although each alternative has similar mix of visitor
23 opportunities, the difference between alternatives are the amount and type of those
24 opportunities that are provided. Alternative 2 has a greater emphasis in providing more
25 primitive types of visitor opportunities within a natural and wild setting. **The no-action**
26 **and alternative 1 emphasis is in providing a greater mix of visitor and choice of**
27 **opportunities and self-discovery.** Finally, alternative 3 provides visitors with the
28 opportunity to be immersed in the settings of those natural and cultural resources that are
29 national significant. This alternative relies upon park educational and interpretive
30 programs to help visitors learn and explore these resources.

31 In addition to the impacts resulting from the actions of implementing the GMP
32 alternatives (discussed previously in the environmental consequences section), the
33 various other actions described below collectively contribute to visitor use and
34 experience in the park. The actions resulting from implementation of the comprehensive
35 plans for each county, the master plans for gateway municipalities, along with their
36 respective specific community plans for parks, trails, open space, and transportation,
37 would all have a long-term, minor to moderate, beneficial impact on visitor experiences
38 in and around the park. Many of these recreational opportunities occur outside the park
39 and other activities cross back and forth of the park boundary such as hiking, running,
40 and horseback riding. The Bay Area contains many local, states, and federal park lands
41 that provide a wide variety of complementary day-use and overnight recreation
42 opportunities; this further provides choices for visitors and local residents in the
43 recreational opportunities and outdoor settings that they participate in. The combination

1 of these managed open space lands provide for long-term, moderate, beneficial
2 cumulative effects on the visitor use and experience.

3 The National Park Service has completed or is in the process of preparing plans with
4 actions that combined with those of the GMP alternatives will enhance recreational
5 opportunities for park visitors. For example, a dog management plan is currently under
6 development and will designate appropriate locations and management strategies for dog-
7 walking activities in the park. A plan to address equestrian activities and facilities Marin
8 County is being developed. The recent renovation of historical Fort Baker into the
9 Cavallo Point Lodge and the expansion of the Headlands Institute and other park partner
10 programs all complement the actions in the GMP alternatives and contribute to the
11 diversity of visitor opportunities.

12 Finally, several other projects and initiatives are being undertaken throughout the Bay
13 Area by a variety of other public, private, and nonprofit organizations. These projects and
14 initiatives include preserving additional open space, renting recreational equipment,
15 providing connections to a larger regional trail network, and promoting other outdoor
16 recreation activities such as hiking, running, surfing, biking, touring, scenic driving,
17 wildlife viewing, and equestrian opportunities. The past, present, and reasonably
18 foreseeable actions of other entities, public and private, combined with those actions
19 resulting from the GMP alternatives will have a long-term, moderate, beneficial
20 cumulative impact on the availability and diversity of outdoor recreational opportunities.

21

22 **Education, Interpretation, and Stewardship Programs and** 23 **Opportunities**

24 The GMP alternatives include several actions that would also expand and enhance
25 education, interpretation, and stewardship programs and opportunities. Thus, all GMP
26 alternatives would have a beneficial effect on visitor use and experience in this regard.
27 The actions included in alternatives 2 and 3 would provide the greatest level of education
28 and stewardship programs compared with the no-action alternative and alternative 1,
29 where programs are provided but the emphasis is more on self-discovery. Additionally,
30 alternative 3 would improve the depth and content of available interpretive information
31 and would encourage visitors to actively immerse themselves in the resource-based
32 experiences (whether natural or cultural). Park partners—such as the Institute at the
33 Golden Gate, Slide Ranch, Crissy Field Center, Headlands Center for the Arts, and
34 numerous others—also play an integral role in all GMP alternatives by complementing
35 and expanding beyond NPS programs. The contribution from a variety of park partners
36 provides educational, interpretive, and stewardship opportunities for all ages from
37 toddlers to the elderly.

38 In addition to the NPS and park partner programs, there are additional environmental
39 education, interpretive, and stewardship opportunities provided by Bay Area educational
40 institutions, environmental education and open space organizations, and the many local,
41 state, and other federal parks that promote an understanding of the region's important and
42 diverse ecological systems and cultural history.

1 The past, present, and reasonably foreseeable actions of other entities, public and private,
2 combined with those actions resulting from the GMP alternatives will have a long-term,
3 moderate, beneficial cumulative impact on the availability and diversity of educational,
4 interpretive, and stewardship programs.

5

6 **Access and Connectivity to Parks and Open Space in the Bay** 7 **Area**

8 All of the GMP alternatives include actions that would expand or enhance access to the
9 park and its connectivity with other parks, trails, and communities in the Bay Area, and
10 thus, all alternatives would have a beneficial effect on visitor use and experience. These
11 expansions and enhancements would primarily come in the form of improved
12 connections with public transportation networks, multimodal access, and increased trail
13 connections with local communities and parks.

14 These various other actions, projects, and initiatives would also contribute to visitor use
15 and experience. For example, most of the comprehensive plans and master plans for the
16 surrounding counties and cities include elements that promote connections with
17 surrounding parks and communities (i.e., transportation connections, pedestrian/bicycle
18 connection, and even parkland connections). Several communities also have issue-
19 specific plans that guide connectivity development, such as public trail plans,
20 transportation plans, and open space plans. Other local, state, and federal parks and open
21 space programs in the Bay Area also implement management plans and projects that
22 improve park land-to-park land trail connections or land connections. This also includes
23 the actions associated with enhancing ferry access throughout the Bay Area and those of
24 the Golden Gate Bridge, Highway and Transportation District, that provide connections
25 for hikers and bikers—in addition to vehicles—between Marin and San Francisco
26 counties. The contribution of other public transportation agencies also beneficially impact
27 visitor use and experience in combination with the GMP alternatives by providing more
28 diverse and efficient options for access to major units of the Golden Gate National
29 Recreation Area.

30 Some specific projects at Golden Gate National Recreation Area (independent of the
31 GMP action alternatives) will also contribute to the cumulative impacts on visitor use and
32 experience. The Trails Forever Initiative, launched in 2003 by the Golden Gate National
33 Parks Conservancy, provides a systematic approach to connecting a world-class system
34 of trails throughout the park. The Muir Woods shuttle improves access to Muir Woods
35 National Monument and the backcountry of Mt. Tamalpais State Park when parking is in
36 short supply. In addition, the park continues to coordinate with local and regional land
37 and water transportation services and their links to the greater Bay Area to provide
38 alternative visitor access to open spaces including the park. These programs, in
39 combination with the GMP alternatives, will provide enhanced recreation opportunities
40 along with better travel connections between park sites, and between communities and
41 the park.

42 The past, present, and reasonably foreseeable actions of other entities, public and private,
43 combined with those actions in the GMP alternatives will have a long-term, moderate,

1 beneficial cumulative impact on access and connectivity to parks and open spaces in the
2 Bay Area

3

4 **SOCIAL AND ECONOMIC ENVIRONMENT**

5 Along with the actions identified in this general management plan for Muir Woods
6 National Monument, the actions identified in a number of plans and projects in the local
7 gateway communities, the three adjacent counties, and the overall San Francisco Bay
8 Area could contribute to cumulative impacts on the social and economic environment in
9 the area. Plans and projects that have a relationship to this general management plan are
10 identified and described in the “Relationship of This Plan to Other Plan” section in part 1
11 and in “Appendix B: Description of Management Plans.” These other plans and
12 management actions all have effects on the social and economic environment, both
13 individually and collectively. These effects mainly relate to (1) the quality of life of local
14 residents; and (2) the economy. The cumulative contributions to the quality of life and
15 economy could extend throughout the gateway communities, the three adjacent counties,
16 and the overall Bay Area.

17 In relationship to the social and economic environment, the cumulative effect of
18 implementing these other plans and projects and the GMP alternatives for Muir Woods
19 National Monument would be quite similar to the cumulative effect of implementing
20 these other plans and projects and the GMP alternatives for Golden Gate National
21 Recreation Area. Therefore, to avoid repeating analyses and conclusions, please refer to
22 the section titled “*Cumulative Impact Analysis at Golden Gate National Recreation Area*
23 *(Including Alcatraz Island.*” However, the transportation component of the monument’s
24 GMP alternatives is unique to this park. The transportation actions included in the GMP
25 action alternatives could affect traffic patterns, park accessibility, and park visitor
26 contributions to the local economy in the gateway communities and Marin County. Thus,
27 these actions could influence the local social and economic environment. A discussion
28 and analysis of this topic are provided below.

29 The no-action alternative and alternatives 1, 2, and 3 include measures to expand shuttle
30 services to and from the monument. The shuttle service would originate at selected transit
31 hubs located in Marin County. Although all action alternatives would include actions that
32 address this change, Alternative 2 includes actions that would yield the greatest amount
33 of change, because under this alternative, the majority of personal motorized vehicles
34 would be prohibited from entering the park. Under alternative 2, all park visitors would
35 access the park via the shuttle, by bicycle, or by foot. The primary goal for these actions
36 is to substantially reduce the impacts of motorized vehicular use in and around the park;
37 this would reduce motor vehicle impacts such as noise, air pollution, traffic, and overflow
38 parking problems. While minimizing these impacts, the proposed actions would also
39 provide an alternate, public transportation option for local residents who otherwise may
40 not have easy access to the park. These actions also would reduce traffic on some Marin
41 County roads that lead to the park. All of these impacts could be beneficial to the quality
42 of life for local residents in Marin County. Alternative 2 would yield the greatest benefit
43 in terms of removing individual vehicles from local roads. However, since these actions
44 could reduce the amount of vehicular traffic en route to the park, a reduction in local

1 business activity may be noticed in the local gateway communities. Fewer people would
2 be driving to and from the park through the local towns, and thus, fewer people would be
3 stopping at local restaurants, stores, and other businesses. As described in the
4 “*Environmental Consequences*” section, this could result in an adverse impact to the
5 local economy.

6 GMP actions that would affect the local economy and the quality of life for local
7 residents could be complemented by the transportation plan actions of the local
8 governments in Marin County and the local and regional transit authorities. These entities
9 will continue to improve and expand public transportation options in Marin County and
10 beyond. As the public transportation network grows and becomes more refined, local and
11 regional residents will have more options to visit the park, with a probable reduction in
12 transit time. These efforts will contribute to quality of life by improving geographic
13 accessibility and reducing traffic congestion. As for economic impacts, since local and
14 regional transportation planning and projects would likely conform to municipal and
15 county master plans, some commercial zoning sectors in Marin County may shift over the
16 years to become concentrated around mass transit hubs. Thus, the initial impacts to local
17 businesses from a reduction in vehicular traffic may eventually be offset by a gain in
18 local business activity in and around the planned transit hub areas.

19 When the likely effects of implementing the actions contained in each of the GMP
20 alternatives for the monument are added to the effects of these other past, present, and
21 reasonably foreseeable transportation actions, a long-term, minor to moderate, beneficial
22 cumulative impact on the quality of life for local residents could result.

23 The impacts of the actions of each GMP alternative on the local economy would
24 constitute a small portion of this overall cumulative effect in the gateway communities
25 and Marin County. When the likely effects of implementing the GMP actions are added
26 to the effects of these other past, present, and reasonably foreseeable transportation
27 actions, a minor, adverse cumulative impact on the local economy could result.
28 However, over time, the cumulative impact could become negligible or beneficial as the
29 transportation systems become predictable and local businesses adapt.

30

31 **TRANSPORTATION**

32 The cumulative impacts on transportation resulting from the actions described in the
33 GMP alternatives in combination with actions resulting from transportation projects and
34 policies of other entities within the Bay Area are identified in this section. In preparing
35 the cumulative impacts on transportation, the actions of the past, present, and foreseeable
36 future were estimated. Input into these cumulative impacts included actions by others
37 within the areas around the park, or potential actions that are described in various park
38 plans already underway or recently completed. Transportation projects external to the
39 park may result in an increase in visitation to the park by improving access for any of the
40 travel modes discussed; or conversely, they may impede movement or burden
41 transportation systems and reduce access. Cumulative transportation impacts of both
42 external and park-originated projects are described below.

1 The transportation actions in the general management plan include expanding regional
2 park ferry access to primary park sites in San Francisco Bay, new embarkations for
3 Alcatraz Ferry, developing strategies for congestion management, and improving the
4 intelligent transportation system and wayfinding applications. Throughout the park,
5 improvements will be made to better connect the park trail system to the regional trail
6 network and to local communities. In addition, improvements will be made to the trail
7 system in Marin and San Francisco counties that include sustainable alignments and
8 design, improved accessibility, and wayfinding signs. In San Mateo, work will begin on a
9 comprehensive trail plan that will guide the development of a trail network on park lands
10 and will identify logical trail connections to strengthen the regional trail network.

11 The above GMP actions, when combined with major past, present, and foreseeable future
12 transportation actions of others, will have a cumulative impact to the transportation
13 system that influences visitor access and circulation. At the Marin Headlands and Fort
14 Baker area, there will be enhanced multi-modal access to park sites. The roadway
15 infrastructure would be rehabilitated or reconstructed without altering the historic
16 character, and parking facilities would be improved. Additional transit options would be
17 provided to and within the Marin Headlands and Fort Baker to improve access to the
18 area. Pedestrian and bicycle access would be improved by closing and rerouting existing
19 trails and constructing new trails. Connectivity—access to the park by all nonmotorized
20 modes, and access to sites within the park by all modes—is likely to be improved. Hiking
21 and biking across the Golden Gate Bridge to the Marin Headlands and Fort Baker will
22 grow as a popular recreational activity; continued coordination between the National Park
23 Service and the Golden Gate Bridge, Highway and Transportation District is required to
24 address increased demands and safety issues. The cumulative impacts of implementing
25 these actions could be long-term, moderate to major, and beneficial.

26 In Marin County, the transportation element of the *Marin Countywide General Plan*
27 *Update* of 2007 guides the list of transportation projects underway or already approved.
28 Projects focus on increasing capacity of arterials and Highway 101; by reducing
29 congestion in the eastern part of the county, these measures may make some park sites at
30 Golden Gate National Recreation Area more easily accessible. Completion of these
31 projects would represent a long-term, minor, beneficial cumulative impact on auto and
32 transit access to Marin parklands, which are primarily located in more rural west Marin
33 County.

34 The *Marin Countywide General Plan* includes an explicitly stated policy to maintain
35 West Marin's rural character, so roads in that area will continue to be two-lane only, with
36 turning lanes, pullouts, and bicycle paths allowable. Muir Beach, Muir Woods National
37 Monument, and Stinson Beach are accessed by these small roads, so congestion during
38 peak periods can be expected to continue or to get worse if there are no programs to
39 provide public transportation or improve bicycle routes. This scenario would have a long-
40 term, minor to moderate, adverse cumulative impact on auto travel to West Marin sites.

41 Many of Golden Gate National Recreation Area's park sites in Marin and San Francisco
42 counties are located along San Francisco Bay. To improve visitor connection and
43 circulation, planners are working to develop a Golden Gate National Recreation Area
44 Water Shuttle Terminals Plan. Although only at the conceptual stage, the plan proposes a
45 water shuttle system to connect park sites on the shore of the San Francisco Bay—Angel

1 Island, Sausalito, Fort Baker, Crissy Field, Fort Mason—as well as the Ferry Building.
2 Routes and destinations have not been finalized, yet. The system itself could be a
3 significant attraction, unique within the national park system. Some visitors could be
4 expected to take the water shuttle from one location to another without disembarking
5 until reaching their point of origin, as a form of recreation in itself. If implemented, this
6 system could have a long-term, moderate to major, beneficial cumulative effect on the
7 connectivity of bayside sites, access to park sites by water, and an increase in the modes
8 of travel.

9 In San Francisco County, the San Francisco Municipal Transportation Authority is
10 implementing a Bus Rapid Transit for Van Ness Avenue, which is a collection of
11 measures to provide rapid and reliable transportation on Van Ness Avenue. The north end
12 of this service terminates within two blocks of Upper Fort Mason and San Francisco
13 Maritime National Historical Park. Given that this part of the city is already served by
14 some transit operations, this project could have long-term, moderate, beneficial
15 cumulative effects on visitor access and on connectivity to the park, allowing visitors to
16 get to the north part of the city without driving and parking a vehicle.

17 A plan is being developed for the E-Line Streetcar Extension that proposes to extend
18 streetcar service from the Embarcadero through San Francisco Maritime National
19 Historical Park and a tunnel under Upper Fort Mason. The E-line Streetcar Extension
20 connects Fisherman’s Wharf to Lower Fort Mason and someday it could extend to Crissy
21 Field. If this project were to go forward, it could have a long-term, major, beneficial
22 cumulative effect on both connectivity and access to this area of Golden Gate National
23 Recreation Area.

24 The Doyle Drive project will rehabilitate a major artery along the northern waterfront of
25 San Francisco through several Golden Gate National Recreation Area sites. The purpose
26 of the proposed project is to improve the seismic, structural, and traffic safety of Doyle
27 Drive and its approach to the Golden Gate Bridge. The project is intended to significantly
28 reduce the adverse effects of the current structure, including noise, visual impacts, and air
29 pollution. The project would place portions of the low viaduct structure below grade or
30 underground, thus removing it from the landscape and restoring visual connections
31 between areas of the Presidio of San Francisco. The results of the project, a safer
32 parkway with some segments underground, is likely to have long-term, major, beneficial
33 cumulative impacts on access to this part of the Golden Gate National Recreation Area by
34 all modes, motorized and nonmotorized. Planned modifications in the Presidio of San
35 Francisco, currently behind Doyle Drive, reconnect it to the shoreline, making it much
36 more accessible by bicycle and foot.

37 In San Mateo County, the California Department of Transportation is working to re-route
38 Highway 1 at Devil’s Slide. This project involves boring two tunnels (one in each
39 direction of traffic flow) beneath an unstable portion of a steep Pacific coast hillside. This
40 section of road has a long history of rockslides and land slippage, causing lengthy
41 closures and millions of dollars in repair costs. This section of Highway 1 lies between
42 two Golden Gate National Recreation Area’s park sites: the Mori Point/Cattle Hill area
43 and Corral de Tierra. It is likely that Pedro Point and lands adjacent to Highway 1 in this
44 area will be added to the park in the foreseeable future. The completion of this project
45 should expedite traffic, reduce traffic congestion, and make travel in the area more

1 reliable, enabling a greater number of people to visit these areas of the Golden Gate
2 National Recreation Area. This would likely have a long-term, minor, beneficial
3 cumulative impact on travel in the area. This improvement may also encourage more
4 people to drive in the area, and therefore could trigger a need for more parking
5 accommodation in the future.

6 The trail system of Golden Gate National Recreation Area and Muir Woods National
7 Monument contribute to a larger county and regional trail network. For example, the
8 Association of Bay Area Governments adopted the San Francisco Bay Trail Plan that
9 proposes to create a trail encircling the San Francisco Bay. A portion of the trail connects
10 with park sites within Golden Gate National Recreation Area in Marin and San Francisco
11 counties. In addition, the California Coastal Trail, a 1,200-mile-long trail between
12 Oregon and Mexico, is integrated with the park's trail network in Marin, San Francisco,
13 and San Mateo counties. The sections of the San Francisco Bay trail and the California
14 Coastal Trail could increase pedestrian and bicycle access to areas throughout the park.
15 These developments would result in a long-term, minor, beneficial cumulative effect on
16 pedestrian and bicycle access to this area, and connectivity to regional transportation.

17 The Golden Gate National Parks Conservancy developed a trail initiative, "Trails
18 Forever," to establish a world-class trail system and protect park resources. Trails Forever
19 is likely to increase pedestrian access (and bicycle access as permitted) to all areas of the
20 Golden Gate National Recreation Area by establishing and repairing trails that connect to
21 surrounding areas, as well as those that connect sites within each park area. As the Trails
22 Forever efforts continue, they are likely to have a long-term, moderate, beneficial
23 cumulative effect on safe, expanded access, connectivity, and circulation to more parts of
24 the Golden Gate National Recreation Area.

25 The wide variety of past, present, and foreseeable future transportation actions resulting
26 from the management of the park and actions of other entities throughout Marin, San
27 Francisco, and San Mateo counties, combined with the actions described in the GMP
28 alternatives would have long-term, moderate to major, beneficial cumulative impacts on
29 the transportation and trail systems.

30

31 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

32 Some past, present and foreseeable future actions being undertaken outside of this
33 general management plan would have impacts on park operations. These "outside"
34 actions, added to the actions proposed in the GMP alternatives, would result in the
35 cumulative impacts to park operations explored below.

36 Park partners engage in a wide variety of activities, including providing interpretation of
37 the park, running concessions such as bookstores and hostels, and organizing volunteers
38 to improve the park. One example of partner support of park operations is fundraising for
39 the renovation of facilities. Increased park staff levels in combination with the actions
40 that park partners have taken and may take in the future would result in beneficial
41 impacts to park operations, including improvements to mission critical assets,
42 improvements to natural and cultural resources, and increased ability to reach out to the

1 community and leverage staff work with volunteer and partner efforts. This would result
2 in major, long-term, beneficial impacts to park operations for all action alternatives. In
3 the no action alternative, with staff levels remaining at current levels, the ability to further
4 leverage partner support would be limited and would have little additional impact,
5 although the continuing impact of staff and partner support is major and beneficial.

6 Agency and partner decisions to share facilities with the National Park Service, such as
7 potentially in San Mateo County, would result in increased operating efficiencies through
8 resource and space sharing, increased quality of working relationships with other
9 organizations, and coordination on land uses; this would have moderate, long-term,
10 beneficial impact to all action alternatives.

11 The National Park Service is pursuing new sustainability measures on Alcatraz Island,
12 including solar power and a submarine electric line to be laid from the peninsula to the
13 island. Those projects, in combination with the GMP policy to improve sustainability,
14 would have moderate to major, beneficial, long-term impacts to the park operations for
15 all action alternatives.

16 If the park pursues future acquisition of lands and the development of facilities not
17 addressed in the GMP alternatives, given the estimated budget and staffing needs of the
18 alternatives, the park budgets and staff would be adversely impacted by being diverted
19 from planned actions. The resulting impact would be long-term, minor to moderate, and
20 adverse for all action alternatives.

21 The current and future expected high cost of housing in the San Francisco Bay Area
22 could make the recruitment and retention of park and partner staff challenging. The
23 action alternatives each propose significant numbers of new staff. Park and partner
24 salaries are frequently lower than needed to afford adequate housing in the Bay Area.
25 Additionally, alternatives 2 and 3 propose reductions in park and partner housing. Given
26 these factors, potential staff may find it difficult to find adequate and affordable housing,
27 and therefore may choose not to work at the park. Not meeting staffing needs identified
28 in the alternatives would result in long-term, moderate to major, adverse impacts to park
29 operations.

30 The major, long-term, beneficial impacts on operations of increased staffing, in
31 combination with the impacts of partner support of park operations, would result in
32 major, long-term, beneficial impacts to park operations in the action alternatives. In the
33 no action alternative, with staff levels remaining at current levels, the ability to further
34 leverage partner support would be limited and would have little additional impact,
35 although the continuing impact of staff and partner support is major and beneficial.
36 Administrative and interpretive office space sharing with other agencies would have
37 moderate, long-term, beneficial impact. Sustainable energy projects on Alcatraz Island in
38 combination with the GMP policy on sustainability would result in moderate to major,
39 beneficial, long-term impacts to park operations. The impact of pursuing land acquisition
40 or facility development outside of GMP proposals would be long-term, minor to
41 moderate, and adverse. Not meeting staffing needs identified in the alternatives would
42 result in long-term, moderate to major, adverse impacts to park operations.

43

CUMULATIVE IMPACT ANALYSIS AT MUIR WOODS NATIONAL MONUMENT

3 METHODOLOGY

4 See the discussion under “Cumulative Impact Analysis at Golden Gate National
5 Recreation Area.”

6

7 NATURAL RESOURCES

8 A number of plans and projects could have cumulative impacts on natural resources.
9 Plans and projects that have a relationship to this general management plan are identified
10 and described in appendix B. Those plans and projects that are most relevant to natural
11 resources and could contribute to cumulative impacts on this topic, a subset of those
12 included in appendix B, include the Redwood Creek Watershed Vision and various
13 restoration projects in the watershed; the Marin County transportation plan; the Muir
14 Woods pilot shuttle; the Mt. Tamalpais State Park management plan; the
15 GGNRA/MUWO fire management plan; the management of lands adjacent to the
16 monument; and past land use practices in the region. Cumulative impacts for Muir
17 Woods National Monument are similar to those described for Golden Gate National
18 Recreation Area, with a few exceptions noted below in the analysis.

19

20 **Carbon Footprint and Air Quality**

21 All of the plans and projects mentioned in the introduction to this section would have
22 cumulative impacts on carbon footprint and air quality. County transportation plans and
23 projects aimed at reducing personal automobile use and improving alternative
24 transportation would have beneficial cumulative impacts by reducing transportation-
25 related emissions. The Muir Woods pilot shuttle would continue to reduce emissions
26 from personal automobile use, lower the carbon footprint of the monument and
27 improving air quality. Projects aimed at improving ecosystems and enhancing natural
28 resources would result in adverse cumulative impacts in the short-term, but would be
29 outweighed by long-term reductions in emissions and the resultant improvement in air
30 quality. The same would be true for the management of adjacent public lands, where
31 near-term projects would have short-term adverse impacts on carbon footprint and air
32 quality, but long-term objectives to reduce energy use and emissions and improve the
33 condition of natural systems would have long-term beneficial cumulative impacts.
34 Regional land protection efforts would continue to preserve open space that removes land
35 available for development and provides air quality benefits. The management of private
36 lands in the region would likely continue to result in adverse impacts to carbon footprint
37 and air quality as they would continue to be sources of energy use and air quality
38 emissions that could increase over time as densities increase.

39 When the likely effects of implementing the actions contained in the GMP alternatives
40 are added to the effects of other past, present, and reasonably foreseeable actions

1 described above, there would be a cumulative adverse impact on carbon footprint and air
2 quality in the short-term and a beneficial cumulative impact on carbon footprint and air
3 quality over the long-term. The actions contained in the GMP alternatives would
4 contribute a very small increment to this cumulative impact.

5

6 **Soils and Geologic Resources and Processes**

7 All of the plans and projects mentioned in the introduction to this section would have
8 cumulative impacts on soils and geologic resources and processes. County transportation
9 plans and projects would modify roadways that would likely result in adverse impacts to
10 roadside soils and geologic resources and would contribute to changes in the functionality
11 of geologic processes in the area. Projects aimed at improving ecosystems and enhancing
12 natural resources could result in adverse cumulative impacts in the short-term, but would
13 be outweighed by long-term improvements to function and integrity of soils and natural
14 geologic processes. The same would be true for the management of adjacent public lands,
15 where near-term projects could have short-term adverse impacts on soils and geologic
16 resources, but long-term objectives to improve natural systems would have long-term
17 beneficial cumulative impacts on soils and geologic processes. Regional land protection
18 efforts would continue to preserve open space and protect soils and geologic resources.
19 The management of private lands in the region would continue to have adverse and
20 beneficial impacts on soils and geologic processes depending on the nature of land use
21 and stewardship practices.

22 When the likely effects of implementing the actions contained in the GMP alternatives
23 are added to the effects of other past, present, and reasonably foreseeable actions
24 described above, there would be a cumulative beneficial impact on soils and geologic
25 resources and processes. The actions contained in the GMP alternatives would contribute
26 a small increment to this cumulative impact.

27

28 **Water Resources and Hydrologic Processes**

29 All of the plans and projects mentioned in the introduction to this section would have
30 cumulative impacts on water resources and hydrologic processes. County transportation
31 plans and projects would modify roadways that could modify surface water flow and
32 drainage. Roadway projects would also likely result in soil erosion and generate urban
33 pollutants that would adversely impact water quality. Conversely, certain projects would
34 reduce sedimentation and improve the conveyance of water—beneficial impacts. Projects
35 aimed at improving ecosystems and enhancing natural resources (i.e., Big Lagoon
36 restoration, Lower Redwood Creek floodplain restoration, Fern Creek riparian fencing,
37 Mission blue butterfly habitat restoration, Coast Trail habitat enhancement projects,
38 sediment reduction projects, and the decommissioning of Muir Woods Road) could result
39 in adverse cumulative impacts to water resources and water quality in the short-term, but
40 would be outweighed by long-term improvements to the integrity and function of water
41 resources, especially for wetlands, floodplains, and natural creek processes. These
42 projects would benefit water quality by reducing erosion and sediment transport,
43 restoring Redwood Creek to provide additional water quality treatment, and by restoring
44 natural drainage patterns. The impacts of the project would be beneficial when

1 considered with other projects in the watershed that also reduce sediment and nutrient
2 transport and generally enhance the watershed's water quality. The same would be true
3 for the management of adjacent public lands, where near-term projects could have short-
4 term adverse impacts on water resources (including water quality and quantity); but long-
5 term beneficial cumulative impacts on water resources and hydrologic processes.
6 Regional land protection efforts would continue to preserve open space and protect water
7 resources. The management of private lands in the region would continue to have adverse
8 and beneficial impacts on water resources and hydrologic processes depending on the
9 nature of land use and stewardship practices.

10 When the likely effects of implementing the actions contained in the GMP alternatives
11 are added to the effects of other past, present, and reasonably foreseeable actions
12 described above, there would be a cumulative beneficial impact on water resources and
13 hydrologic processes. The actions contained in the GMP alternatives would contribute a
14 small increment to this cumulative impact.

15

16 **Habitat (Vegetation and Wildlife) and Special Status Species** 17 **(Federal and State Threatened and Endangered Species)**

18 All of the plans and projects mentioned in the introduction to this section would have
19 cumulative impacts on vegetation and wildlife habitat. County transportation plans and
20 projects would modify roadways that could alter the integrity of native habitat, increase
21 habitat fragmentation, and introduce exotic plants and animals that could displace and
22 adversely affect native species, including special status species. Roadway projects would
23 also likely result in soil erosion and generate urban pollutants that would adversely
24 impact aquatic habitats. Conversely, certain projects would reduce impacts from
25 roadways and improve migration corridors. Restoration projects aimed at improving
26 ecosystems and enhancing natural resources (i.e., Big Lagoon restoration, Lower
27 Redwood Creek floodplain restoration, Fern Creek riparian fencing, Mission blue
28 butterfly habitat restoration, Coast Trail habitat enhancement projects, sediment reduction
29 projects, the decommissioning of Muir Woods Road, park fire road rehabilitation, Green
30 Gulch Farm's removal of concrete lining from tributary, and the Kent Canyon culvert
31 replacement) could result in adverse cumulative impacts to native habitat in the short-
32 term, but would be outweighed by long-term improvements to the integrity and function
33 of habitat. These projects would improve water quality by reducing sediment inputs,
34 prevent the trampling of vegetation, remove invasive riparian plants, improve fish
35 passage, create pool habitat, and removed artificial bank protection. The 2003 and 2007
36 Lower Redwood Creek projects have direct benefits for salmonids by expanding and
37 enhancing available winter and summer rearing habitat. Therefore, the beneficial impacts
38 of the project, considered with the beneficial impacts of other local projects, would be
39 cumulatively beneficial.

40 The same would be true for the management of adjacent public lands, where near-term
41 projects could have short-term adverse impacts on habitat, but long-term objectives to
42 improve natural systems would have long-term beneficial cumulative impacts on habitat
43 integrity and function. Regional land protection efforts would continue to preserve open
44 space and protect a variety of habitat types. The management of private lands in the

1 region would continue to have adverse and beneficial impacts on vegetation and wildlife
2 habitat depending on the nature of land use and stewardship practices.

3 When the likely effects of implementing the actions contained in the GMP alternatives
4 are added to the effects of other past, present, and reasonably foreseeable actions
5 described above, there would be a cumulative beneficial impact on vegetation and
6 wildlife habitat would be beneficial. Although impacts on local special status species and
7 their habitat in the project area would be mitigated to minimize potential impacts and
8 impacts of other projects in the area would generally be beneficial, impacts from
9 urbanization of the region would continue to result in habitat loss and the cumulative
10 impact to most special status species and their habitat would be adverse. The actions
11 contained in the GMP alternatives would contribute a small increment to this cumulative
12 impact.

13

14 **CULTURAL RESOURCES**

15 A number of past, present, and ongoing plans, programs, and projects could have
16 cumulative impacts on cultural resources, if implemented. Plans, programs, and projects
17 that have a relationship to this general management plan are described in the
18 “Relationship of This Plan to Other Plans” section in Part 1 and in “Appendix B:
19 Description of Management Plans.” Those plans and projects that are most relevant to
20 and could contribute to cumulative impacts on cultural resources at Muir Woods National
21 Monument include the following:

- 22 • NPS restoration plans such as the Redwood Creek Watershed: Vision for the
23 Future [2003]
- 24 • State and regional plans such as the California Department of Parks and
25 Recreation Mount Tamalpais State Park General Plan [1980]
- 26 • County and local plans such as the Marin Countywide Plan [2007] and amended
27 [2009]

28 Past human use and practices and management of lands in and near Muir Woods National
29 Monument, such as construction associated with urban, suburban, and recreational
30 development, have also contributed to cumulative impacts on cultural resources.

31

32 **Archeological Resources**

33 Implementation of NPS restoration plans, state and regional plans, and county and local
34 plans would have generally beneficial cumulative impacts on archeological resources
35 because they emphasize protection and preservation of cultural resources and mitigation
36 if sites cannot be avoided. Past human use and management of lands in and near the
37 monument, such as construction associated with urban, suburban, and recreational
38 development, have generally had adverse impacts on archeological resources because of
39 the unknown number of archeological sites that may have been lost or degraded as a
40 result of ground disturbing operations.

1 When the likely impacts of implementing the actions contained in the GMP alternatives
2 are added to the impacts of other past, present, and reasonably foreseeable actions
3 described above, there would be long-term, adverse, cumulative impacts on archeological
4 resources on lands in and near the monument. The actions contained in the GMP
5 alternatives, however, would generally contribute a small beneficial increment to the
6 overall adverse cumulative impacts to archeological resources.

7

8 **Historic Buildings**

9 NPS restoration plans; state and regional plans, and county and local plans all provide for
10 the protection and preservation of historic buildings and their architectural values and,
11 therefore, would contribute to beneficial cumulative impacts on historic buildings, if
12 implemented. Past human use and management of lands in and near the monument, such
13 as construction associated with urban, suburban, and recreational development, have
14 generally had adverse impacts on historic buildings, resulting in the loss of historic
15 buildings and historic fabric.

16 When the likely effects of implementing the actions contained in the GMP alternatives
17 are added to the impacts of other past, present, and reasonably foreseeable actions
18 described above, there would be a long-term, minor, beneficial cumulative impact to
19 historic buildings. The actions contained in the GMP alternatives would contribute a
20 small increment to these overall cumulative impacts.

21

22 **Cultural Landscape Resources**

23 National Park Service restoration plans, state and regional plans, and county and local
24 plans all provide for the protection and preservation of cultural landscape resources and,
25 therefore, would contribute to beneficial cumulative impacts on cultural landscape
26 resources, if implemented. Past human use and management of lands in and near the
27 monument, such as construction associated with urban, suburban, and recreational
28 development, have generally had adverse impacts on cultural landscapes, resulting in the
29 loss or degradation of numerous cultural landscape resources.

30 When the likely effects of implementing the actions contained in the GMP alternatives
31 are added to the impacts of other past, present, and reasonably foreseeable actions
32 described above, there would be a long-term, minor to moderate, beneficial cumulative
33 impact to cultural landscape resources. However, the actions contained in the GMP
34 alternatives would contribute only a small increment to the overall cumulative impacts on
35 cultural landscape resources.

36

37 **Museum Collections**

38 The cumulative impacts to the museum collections are addressed in the “Golden Gate
39 National Recreation Area” section.

40

41

1 **VISITOR USE AND EXPERIENCE**

2 The cumulative impacts for visitor use and experience at Muir Woods National
3 Monument are the same as those described for Golden Gate National Recreation Area.

4 **SOCIAL AND ECONOMIC ENVIRONMENT**

5 Along with the actions identified in this general management plan for Muir Woods
6 National Monument, the actions identified in a number of plans and projects in the local
7 gateway communities, the three adjacent counties, and the overall San Francisco Bay
8 Area could contribute to cumulative impacts on the social and economic environment in
9 the area. Plans and projects that have a relationship to this general management plan are
10 identified and described in the “Relationship of This Plan to Other Plan” section in part 1
11 and in “Appendix B: Description of Management Plans.” These other plans and
12 management actions all have effects on the social and economic environment, both
13 individually and collectively. These effects mainly relate to (1) the quality of life of local
14 residents; and (2) the economy. The cumulative contributions to the quality of life and
15 economy could extend throughout the gateway communities, the three adjacent counties,
16 and the overall Bay Area.

17 In relationship to the social and economic environment, the cumulative effect of
18 implementing these other plans and projects and the GMP alternatives for Muir Woods
19 National Monument would be quite similar to the cumulative effect of implementing
20 these other plans and projects and the GMP alternatives for Golden Gate National
21 Recreation Area. Therefore, to avoid repeating analyses and conclusions, please refer to
22 the section titled “*Cumulative Impact Analysis at Golden Gate National Recreation Area*
23 *(Including Alcatraz Island.*” However, the transportation component of the monument’s
24 GMP alternatives is unique to this park. The transportation actions included in the GMP
25 action alternatives could affect traffic patterns, park accessibility, and park visitor
26 contributions to the local economy in the gateway communities and Marin County. Thus,
27 these actions could influence the local social and economic environment. A discussion
28 and analysis of this topic are provided below.

29 The no-action alternative and alternatives 1, 2, and 3 include measures to expand shuttle
30 services to and from the monument. The shuttle service would originate at selected transit
31 hubs located in Marin County. Although all action alternatives would include actions that
32 address this change, Alternative 2 includes actions that would yield the greatest amount
33 of change, because under this alternative, the majority of personal motorized vehicles
34 would be prohibited from entering the park. Under alternative 2, all park visitors would
35 access the park via the shuttle, by bicycle, or by foot. The primary goal for these actions
36 is to substantially reduce the impacts of motorized vehicular use in and around the park;
37 this would reduce motor vehicle impacts such as noise, air pollution, traffic, and overflow
38 parking problems. While minimizing these impacts, the proposed actions would also
39 provide an alternate, public transportation option for local residents who otherwise may
40 not have easy access to the park. These actions also would reduce traffic on some Marin
41 County roads that lead to the park. All of these impacts could be beneficial to the quality
42 of life for local residents in Marin County. Alternative 2 would yield the greatest benefit
43 in terms of removing individual vehicles from local roads. However, since these actions

1 could reduce the amount of vehicular traffic en route to the park, a reduction in local
2 business activity may be noticed in the local gateway communities. Fewer people would
3 be driving to and from the park through the local towns, and thus, fewer people would be
4 stopping at local restaurants, stores, and other businesses. As described in the
5 “*Environmental Consequences*” section, this could result in an adverse impact to the
6 local economy.

7 GMP actions that would affect the local economy and the quality of life for local
8 residents could be complemented by the transportation plan actions of the local
9 governments in Marin County and the local and regional transit authorities. These entities
10 will continue to improve and expand public transportation options in Marin County and
11 beyond. As the public transportation network grows and becomes more refined, local and
12 regional residents will have more options to visit the park, with a probable reduction in
13 transit time. These efforts will contribute to quality of life by improving geographic
14 accessibility and reducing traffic congestion. As for economic impacts, since local and
15 regional transportation planning and projects would likely conform to municipal and
16 county master plans, some commercial zoning sectors in Marin County may shift over the
17 years to become concentrated around mass transit hubs. Thus, the initial impacts to local
18 businesses from a reduction in vehicular traffic may eventually be offset by a gain in
19 local business activity in and around the planned transit hub areas.

20 When the likely effects of implementing the actions contained in each of the GMP
21 alternatives for the monument are added to the effects of these other past, present, and
22 reasonably foreseeable transportation actions, a long-term, minor to moderate, beneficial
23 cumulative impact on the quality of life for local residents could result.

24 The impacts of the actions of each GMP alternative on the local economy would
25 constitute a small portion of this overall cumulative effect in the gateway communities
26 and Marin County. When the likely effects of implementing the GMP actions are added
27 to the effects of these other past, present, and reasonably foreseeable transportation
28 actions, a, minor, adverse cumulative impact on the local economy could result.
29 However, over time, the cumulative impact could become negligible or beneficial as the
30 transportation systems become predictable and local businesses adapt.

31

32 **TRANSPORTATION**

33 See the transportation discussion under “Cumulative Impact Analysis at Golden Gate
34 National Recreation Area.”

35

36 **PARK MANAGEMENT, OPERATIONS, AND FACILITIES**

37 Staffing increases described in the analysis in combination with actions that partners may
38 take would result in long-term, beneficial impacts to park operations, including
39 improvements to mission critical assets and natural and cultural resources, and increased
40 ability to reach out to the community and leverage staff work with volunteer and partner

1 efforts. This would result in major, long-term, beneficial impact to park operations for all
2 action alternatives. In the no action alternative, with staff levels remaining the same as
3 existing, the ability to further leverage partner support would be limited and would have
4 little additional impact, although the continuing impact of staff and partner support is
5 major and beneficial.

6 If the park pursues future acquisition of lands and development of facilities not addressed
7 in the GMP alternatives, given the estimated budget and staffing needs of the alternatives,
8 the park budgets and staff would be adversely impacted by being diverted from planned
9 actions. The resulting impact would be long-term, minor to moderate, and adverse.

10 The current and future expected high cost of housing in the San Francisco Bay Area
11 could make the recruitment and retention of park and partner staff challenging. The
12 action alternatives each propose significant numbers of new staff. Park and partner
13 salaries are frequently lower than needed to afford adequate housing in the Bay Area.
14 Given these factors, potential staff may find it difficult to find adequate and affordable
15 housing, and therefore may choose not to work at the park. Not meeting staffing needs
16 identified in the alternatives would result in long-term, moderate to major, adverse
17 impacts to park operations.

18 The major, long-term, beneficial impacts on operations of increased staffing, in
19 combination with the impacts of partner support of park operations, would result in
20 major, long-term, beneficial impacts to park operations in the action alternatives. In the
21 no action alternative, with staff levels remaining at current levels, the ability to further
22 leverage partner support would be limited and would have little additional impact,
23 although the continuing impact of staff and partner support is major and beneficial. The
24 impact of pursuing land acquisition or facility development outside of GMP proposals
25 would be long-term, minor to moderate, and adverse. Not meeting staffing needs due to
26 the high cost of housing would result in long-term, moderate to major, adverse impacts to
27 park operations.

ADDITIONAL ANALYSES

NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

None of the alternatives being considered would result in the extraction of new resources from the parks. In all of the alternatives, ecological principles would be applied to ensure that the two parks' natural resources were maintained and protected. Certain resources could continue to be collected for scientific and educational purposes, but the specimens would be stored in the NPS collection. Agricultural operations on NPS lands would continue to result in the extraction of resources through the harvesting of crops, which assist in meeting cultural landscape objectives. The fields would be managed to sustain this harvest. Implementation of the alternatives would result in the use of limited natural resources and energy for construction and operation of new recreational facilities and for restoration activities. New development would be designed to be sustainable to the maximum extent practicable. The use and consumption of fuel and other nonrenewable resources for NPS operations, activities, and development associated with the alternatives would be very small in comparison to that of the region. Overall, the impact on this topic resulting from implementation of this general management plan would likely be negligible.

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION

CEQ guidelines for implementing NEPA require examination of energy requirements and conservation potential in environmental impact statements. Park Service staff strive to incorporate the principles of sustainable design and development into all facilities and park operations. Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short-term and long-term environmental impacts of developments and other activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques.

The NPS *Guiding Principles of Sustainable Design* (1993) provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of bio-diversity, and encourages responsible decisions. The guidebook describes principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. The National Park Service would minimize energy costs, eliminate waste, and conserve energy resources by using energy efficient and cost effective technology wherever possible. Recent examples include projects to install photovoltaic panels on the NPS Headquarters building at Fort Mason and projects to pursue alternative energy options at Alcatraz Island (both part of the no-action alternative). Energy efficiency would also be incorporated into any decision-

making process during the design or acquisition of facilities, as well as all decisions affecting park operations.

The use of value analysis and value engineering, including life cycle cost analysis, would be performed to examine energy, environmental, and economic implications of proposed NPS development. Park Service staff would encourage suppliers, permittees, and contractors to follow sustainable practices and would address sustainable park and park partner practices in interpretive programs.

The energy requirements of the plan's alternatives (for Alcatraz, Muir Woods, and the three-county area) were examined. At Muir Woods, propane (gallons of fuel) and electricity (kilowatt hours per year) usage would be reduced under all of the action alternatives; while the use of natural gas to provide expanded shuttle service would increase substantially.

At Alcatraz, diesel use (gallons of fuel) and electricity use (kilowatt hours per year) would be increased under all of the action alternatives.

At park sites within the three-county area of GGNRA, diesel use (gallons of fuel) and electricity use (kilowatt hours per year) would be slightly reduced under all of the action alternatives. In San Mateo County, energy requirements would increase under all of the action alternatives because facilities would be developed where the National Park Service currently has no recreational or operational presence.

Overall, compared to energy requirements and use in the local area or the region, energy consumption by the National Park Service would be negligible. Consequently, any adverse impacts relating to energy use, availability, or conservation would be negligible.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

The energy requirements identified above (for all alternatives) would result in an irreversible commitment of resources. Furthermore, construction materials, including gravel and other rock and earthen materials, would be irretrievably committed toward the construction of new recreational and operations facilities. National Park Service employee time would be committed to implementation of various elements of the plan, which would also constitute an irretrievable commitment of resources. There would be no permanent effects on park resources resulting from these actions.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. Adverse impacts on natural and cultural resources and visitor experience could occur in some areas throughout the two parks as a result of public use (i.e., impacts to resources from concentrated visitor use, vandalism, etc.) or NPS management activities (i.e., impacts from construction activities, emergency response, etc.)

RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

Under the no-action alternative, short-term uses of the environment such as public use of the area would continue to occur. Public use and new recreational development would be expanded under one or more of the action alternatives, resulting in potential temporary disturbances to vegetation communities, various species of wildlife, and visitor access and experiences. The use of construction phasing and/or implementation of mitigation measures would reduce or eliminate the potential for most of these short-term impacts.

Under all of the alternatives, most of the park lands would be protected in a natural state and would maintain their long-term productivity. Only a small percentage of the two parks would be maintained as developed areas. Furthermore, the action alternatives include improvements to existing site conditions and the restoration of natural habitats and stream systems. These actions would improve ecological function and the long-term productivity of the environment.

PART 11: CONSULTATION, COORDINATION, AND PREPARATION

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PUBLIC INVOLVEMENT

The Golden Gate National Recreation Area / Muir Woods National Monument General Management Plan / Environmental Impact Statement represents contributions from hundreds of members of the public; park partners; a variety of local, regional, and national agencies and organizations; and the staff of the National Park Service—all of whom are interested in a the vision that will successfully guide the park and monument over the next 25 years. The legal requirement (Notice of Intent) of notifying the public that the National Park Service is preparing a draft environmental impact statement for a general management plan was published in the Federal Register, Vol. 71, No. 60, March 29, 2006.

Throughout the planning process, the planning team used a variety of methods to regularly communicate with the public stakeholders who were interested in the development of the general management plan. The foundation of communications was the preparation and distribution of newsletters and postcard updates. Five newsletters were produced and distributed before the publication of this draft plan. Each newsletter was mailed to more than 4,000 names listed on the park's mailing address. Newsletters #2 through #5 were translated into Chinese and Spanish. In addition to mailings, thousands of newsletters were distributed at key park sites, especially those sites that hosted national and international visitors. Each newsletter and announcement was also posted at the park planning website and sent by e-mail to public and organizations listed in the park's e-mail distribution list.

Four times a year, the park managers hosted an evening for questions and answers associated with park planning and management activities. These quarterly meetings were hosted throughout Marin, San Francisco, and San Mateo counties. At festivals throughout these counties, the park staff would host planning tents as another tool to communicate with the public and to invite them into the planning process. In addition, members of the planning team would meet with individual organizations and local communities to discuss how their concerns and ideas were being addressed in the development of the general management plan.

The first newsletter, issued in March 2006 and sent to more than 4,000 addresses from the mailing list, described the Golden Gate National Recreation Area/Muir Woods National Monument General Management Plan (GMP) process. The newsletter also included a comment form that asked people what they value and like most about the park, what they like least, their suggestions for management, their major concerns for the future of the park, and any other comments they wanted to provide to the GMP team. Nearly 300 electronic and mailed comments were received in response to this newsletter. Further, five public open houses were held in April 2006 in Marin, San Francisco, and San Mateo counties to gather additional input from the public. Focus groups with environmental, historic, and diversity organizations, as well as meetings with Native American representatives, park partners, and park founders, were also held to gather information about what these groups value about the park, and to gather their concerns and ideas for the general management plan. The results of recent internal scoping meetings with park staff, in addition to meetings held in 2001 and 2003, were also included in this planning step. The results from all the initial planning meetings (scoping)

were reported to the public in Newsletter #2. All the public comments and the team's analysis of those comments were documented in a report *Scoping Summary 2006, General Management Plan* and made available at the park planning website. The public comments and related analysis helped guide the planning team in developing ways to address the planning issues and in developing the alternatives.

Newsletter #3 reported to the public the issues that the plan would address and a provided a description of the alternative concepts that would be used to guide the development of the GMP alternatives.

Throughout the spring and early summer of 2008, the park staff tested with the public the preliminary alternatives that the planning team had developed. Eight thousand copies of a 48-page newsletter that detailed the preliminary alternatives and invited public comments were distributed by mail and at key park and gateway community locations. Public comments were accepted between April 29 and August 1, 2008. More than 200 responses were posted by individuals and groups at the park planning website. The park staff hosted five public workshops and numerous meetings with various interest groups throughout the Bay Area to gather public response and to facilitate discussions of issues that were of concern. These workshops were attended by approximately 300 people. In addition, more than 180 letters and comment forms were received from a variety of individuals, organizations, and agencies. Overall, more than 45 commenters, provided more than 1,500 substantive comments on the GMP preliminary alternatives. All the public comments, petitions, and letters, including the planning team's analysis of those comments, were documented in a report *Summary of Public Comments on the Preliminary Alternatives* and made available at the park planning website. The park staff used this guidance in revising / strengthening the alternatives and when choosing the NPS preferred alternative. Newsletter #5 was distributed in 2009; it included a summary of public comments regarding the preliminary alternatives, highlights of the NPS preferred alternatives, and a status of the GMP planning process.

Finally, the GMP planning team monitored other park planning activities to ensure compatibility among proposed actions (e.g., Dog Management Plan, Marin Equestrian Plan).

Additional Public Outreach Activities Outside the Park

Planning / GMP Open House

Mill Valley, CA (2 meetings)

Muir Beach, CA

Pacifica, CA (4 meetings)

Princeton / Moss Beach, CA

San Francisco, CA (5 meetings)

Sausalito, CA (2 meetings)

Woodside, CA

Additional Public Outreach Activities within the Park

Information tables were made available at Tennessee Valley, Rodeo Beach, Linda Mar/Pacific State Beach, McNee Ranch State Park, Crissy Field, Point Reyes National Park.

CONSULTATION WITH OTHER AGENCIES, OFFICIALS, AND ORGANIZATIONS

Members of the planning team held planning tents, meetings, and roundtable discussions with the follow agencies and organizations:

Cabrillo Unified School District

Coalition to Save Ocean Beach/Friends of Sutro Park

Critical Coastal Area Task Force

IYELL

Marin City Labor Day Festival participants

Marin County Local Coastal Plan Update

Marin Horse Council

Mori Point Dedication Ceremony participants

Muir Beach CSD

Muir Woods Centennial event participants

North Coast Water District

Pacifica GGNRA Liaison Committee (city)

Peninsula Open Space Trust (POST)

Peninsula Working Group

People for Open Space

Rancho Corral de Tierra Public Workshop

Redwood Ramble

Run for the Seals event participants

San Francisco Maritime National Historical Park

San Francisco Ocean Beach Vision Council

San Francisco Planning and Urban Research Association (SPUR)

San Mateo County Parks

Stinson Beach (community meeting)

Stinson Beach CSD

Sweeney Saunter

SECTION 7 CONSULTATION

During the preparation of the general management plan, NPS staff contacted the Sacramento, California office of the U.S. Fish and Wildlife Service and the Santa Rosa, California office of NOAA – National Marine Fisheries Service to begin the consultation process.

In accordance with the Endangered Species Act and relevant regulations at 50 CFR Part 402, the National Park Service determined that this general management plan is not likely to adversely affect any federal-listed threatened or endangered species. The National Park Service will send a copy of this draft management plan to the US. Fish and Wildlife Service and NOAA – National Marine Fisheries Service with a request for a written concurrence with this determination.

In addition, the National Park Service has committed to consult on future actions conducted under the framework described in this management plan to ensure that such actions are not likely to adversely affect threatened or endangered species or species of concern.

SECTION 106 CONSULTATION WITH STATE HISTORIC PRESERVATION OFFICE

Agencies that have direct or indirect jurisdiction over historic properties are required by Section 106 of the National Historic Preservation Act of 1966, as amended, to take into account the effect of any undertaking on properties eligible for listing in the National Register of Historic Places. To meet the requirements of 36 CFR 800, the National Park Service has sent a letter to the California state historic preservation officer, and the Advisory Council on Historic Preservation on _____, inviting their participation in the planning process. Newsletters associated with this plan were sent to this office.

Under the terms of 1995 programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, the National Park Service, in consultation with the state historic preservation office, will make a determination about which undertakings are programmatic exclusions and which require further compliance (see table _____).

CONSULTATIONS WITH NATIVE AMERICANS

Letters were sent to the following Native American groups on _____, inviting their participation in the general management plan planning process. *Add Names*

A scoping meeting with the following Native American groups was held in San Francisco, California on _____ to discuss issues, concerns, and opportunities. Subsequently, newsletters associated with this planning process were sent to these groups in addition to the annual park briefing update. *Look up to see the name of this bulletin and its frequency in distribution.*

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING A COPY OF THIS DOCUMENT

Need to develop list

List of recipients

List of all agencies, organizations, and people to whom copies will be sent.

Federal agencies organized alphabetically

State and regional agencies

Local agencies

Indian tribes

Organizations

Individuals (if the list of individuals is longer than 3 pages, it may be placed in the project file instead of the EIS, with the notation in the EIS that the complete list of recipients is provided as necessary to indicate who will be receiving the final EIS)

PREPARERS AND CONSULTANTS

The GMP planning team consisted of managers (Steering Committee) who guided the entire planning process. When developing and reviewing the issues and alternatives, the planning team included more than 50 managers and resource/technical specialists from the National Park Service and Golden Gate Parks Conservancy. In addition, the planning team included staff of the California State Parks, experts from academia, and members of consulting firms. Most of these planning team members also participated in various working groups that focused on individual issues and identified solutions that were incorporated into the GMP alternatives. Working groups were formed to address the following topics: Alcatraz Vision Team, Asset Management, Climate Change, Operational Facilities, Marine Resources, Native Americans, Park Boundaries, Partnerships, Trails, and Transportation.

Please include you bio in the following manner and provide to Stephan:

Member's Name, Position, __ years with NPS and profession or NPS, College degree

Example:

Ray Murray, Chief of Partnerships, 27 years with the NPS, 13 years with the Bureau of Outdoor Recreation, 3 years with the Heritage Conservation and Recreation Service; B.S. In Forestry

STEERING COMMITTEE

Brian Aviles, Position

Mai-Liis Bartling

Frank Dean

Daphne Hatch

Nancy Hornor

Susan Hurst

Craig Kenkel

Howard Levitt

Brian O'Neill

Chris Powell

Aaron Roth

TEAM MEMBERS – CALIFORNIA

(In addition to the members of the GMP Steering Committee)

Cathie Barner, Golden Gate National Parks Conservancy

Paul Batlan

Kim Coast

Martha Crusius

Jay Eickenhorst

Sharon Farrell, Golden Gate National Parks Conservancy

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Sue Fritzke

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Tom Lindberg, California State Parks

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Mia Monroe

Yvette Ruan

Michael Savidge

Jerry Scheumann

Paul Scolari

Emilyn Sheffield

Ed Ueber

Tamara Williams

TEAM MEMBERS – NPS DENVER SERVICE CENTER

Planning team

Sarah Bodo, Community Planner; 3 years with the National Park Service; Master of Urban and Regional Planning, B.S. in Finance.

Kerri Cahill

Patrick Malone, Natural Resource Specialist; 5 years with the National Park Service, 9 years with state and local government, and 2 years with a nonprofit land trust; M.P.A. in Environmental Policy and Public Management, B.S. in Natural Resources and Environmental Management

Stephan Nofield, Project Manager/Senior Planner;

Scott Robson

Harlan Unrau

Don Wojcik, Community Planner; 1 year with the National Park Service, 11 years as natural resource planner with county government open space programs, 5 years as environmental policy analyst with nonprofit and academic organizations, and 2 years as civil engineer with municipal government; Master of Public Affairs in Environmental Policy and Natural Resource Management; B.S. in Civil and Environmental Engineering.

Production Services

Jim Corbett, Visual Information Specialist;

June McMillen, Writer/Editor; 22 years with the National Park Service, 8 years with the U.S. Forest Service; Master of Environmental Science, B.A. in Anthropology.

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Bonnie Nelson, Nelson/Nygaard

Peter Newman, Colorado State University

Diane Nicholson

Nina Roberts

Amy Merrill, Stillwater Sciences

Cliff Riebe, Stillwater Sciences

Alexa Viets

Don Weeks

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